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ABSTRACT

This report comprises a detailed evaluation of three IBM microcomputer-based school information management systems: Student Information and Records System (SIRS) by Management Information Group, The School System (TSS) by Columbia Computing Services, and Computer Educational Management Accounting System (CEMAS) by Computerlib. These three systems were evaluated against six major factors, each defined by a detailed and comprehensive set of criteria: product scope and function, ease of use, technical considerations, support and services, product qualifications, and vendor. All evaluations were conducted in schools using real and full school data, and all key system capabilities were tested as they related to database creation and maintenance, prescheduling, scheduling, transition to operational status (and semester turnover), attendance recording and reporting, progress recording and reporting, report generation, and utility functions. Each product evaluation describes the testing environment and conditions, lists evaluation results and observations, and summarizes the strengths and weaknesses of the system. Results show that one system, The School System by Columbia Computing Services, can effectively meet the needs of both junior and senior high schools. Six appendixes are included: the general questionnaire from which the criteria were derived, the interview guide and detailed checklist, the detailed scoring comparison form, SIRS user group member list, recent product developments, and a full re-simulation of the relative suitability of the three systems. (TE)

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Microcomputer-Based Student Information Management Systems in Alberta Schools

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MICROCOMPUTER BASED SCHOOL INFORMATION MANAGEMENT SYSTEMS (SIMS) IN ALBERTA JUNIOR AND SENIOR HIGH SCHOOLS

FINAL REPORT

by

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Under Contract to Alberta Education, Edmonton, Alberta

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We would like to thank Collins Meek and his staff for sharing our visions and for smoothing the pathway to the achievement of our objectives. Finally, we would like to thank Alberta Education for their support of this project.

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1.0 INTRODUCTION

Recent rapid advances in the computer technology and related fields have greatly increased the spectrum of opportunities for the application of computers. While increasing in power and performance, computers have also become more affordable and easier to use. Increasingly, educational administrators are seeking to apply the technology to the administration of schools. Many tasks which were once considered addressable only by large centralized mainframe computers can now be addressed by microcomputers. An example of such tasks is organization for instruction. School administrators are becoming increasingly interested in the local application of computer technology to school information management.

Among the computer based applications which exist for school administrators today are School Information Management Systems (SIMS) with a particular focus on student related information. These systems may be microcomputer or minicomputer based and, typically, incorporate four major modules which address school records, student scheduling, student attendance and marks or progress reporting. Usually, there is a high degree of integration between the modules which means, for example, that duplicate data bases are not required. In most cases, the cost of these software systems belies their complexity. Four thousand dollars buys multi-megabytes of software opportunity. In all cases, it is safe to assume that the cost of the software system itself will be the least impacting factor in any decision to apply it.

The purpose of the work which is reported on here was to evaluate the comparative suitability of two microcomputer based SIMS for use at the senior high school level. This endeavour was one component of a more global investigation of SIMS alternatives for high school use. In particular, Edmonton Public Schools and Alberta Education jointly funded the investigation of minicomputer based approaches to school information management as well. This initiative will be the focus of another report to be released in the near future. All investigations (of both mini and microcomputer based systems) were performed according to a thorough and objective evaluation process which was developed specifically for the purpose. The approach to evaluation is described in detail in a report entitled Selection Criteria for Integrated School Information Management Systems (available from Alberta Education).

In view of the extemely high general level of interest in this area, the scope of the project was widened (in two ways). Firstly, three systems were evaluated rather than two and secondly, the systems were evaluated for their suitability to junior high schools rather than just to the senior high schools.

The systems evaluated were

- Student Information and Records System (SIRS) by Management Information Group
- The School System (TSS) by Columbia Computing Services
- Computer Educational Management Accounting System (CEMAS) by Computerlib

The evaluation of CEMAS began in October 1983 and was completed in October 1984. SIRS was evaluated in two phases - the first phase was between April 1984 and June 1984 while the second phase was between Oct 1984 and January 1985. The School System was evaluated between October 1984 and January 1985.

All the systems were evaluated on IBM Microcomputers.

2.0 APPROACH TO EVALUATION

2.1 Evaluation Criteria

The three systems under investigation were evaluated against six major factors. These major evaluation factors were:

o Product Scope and Function	(what does it do and how well does it do it)
o Ease of Use	(user friendliness)
o Technical Considerations	(system design, structure, operation etc)
o Support and Services	(after sales service)
o Product Qualifications	(product credibility, history, etc.)
o Vendor	(who stands behind the product)

Each of the six major evaluation factors was defined by a detailed and comprehensive set of criteria. Information gained from consultations with schools was paramount in the development of the criteria. The criteria were developed through a six step process as outlined below:

Step 1 A General Questionnaire (see Appendix 1), Interview Guide and Detailed Checklist (see Appendix 2) were developed for the gathering of information from the schools. These documents were developed using information gained through prior, extensive contact with schools in general, through the experiences of Information Services staff, and with a working knowledge of the characteristics of currently available systems. The general questionnaire was designed to determine which features and characteristics a SIMS should include and, in many cases, their relative importance. Where measures of the relative importance of a criterion or characteristic were required, the questionnaire featured a simple four point "must, "important", "optional" and "not required" scale for respondents to check.

Step 2 Eighteen district schools were identified as a representative sample through which detailed school information management needs and requirements would be confirmed. These schools were carefully chosen to reflect many of the key variables such as school level, size, programs, organization and operational style.

Step 3 The General Questionnaire was sent to the 18 identified schools together with a statement of its purpose and instructions for its completion. Participating schools were requested to give careful consideration to their responses to the questionnaire and to prepare for a follow-up interview. The questionnaire also allowed participants to respond to needs and requirements not specifically identified in the survey.

Step 4 After allowing ample time for the completion of the questionnaire, follow-up interviews were conducted at each school using the Interview Guide and Detailed Checklist referred to previously. The purpose of this step was to clarify and confirm responses relative to the questionnaire. A key reason for the two stage information gathering process (questionnaire followed by the interview) was to allow the schools to first respond without external influence of any kind.

Step 5 Information gathered through the administration of the questionnaire and subsequent interviews was compiled and analyzed and used to determine the relative importance of selection criteria items. Particular attention was paid to the comments of participating schools since this sometimes led to the inclusion of additional criteria items which might otherwise have been missed.

Step 6 Simple qualitative and quantitative analysis of the questionnaire, its findings, and the results of the interviews led to the definition of the detailed criteria as well as to the determination of weighting factors. The Detailed Evaluation (or Selection) Criteria in tabular form and a description of the column entries are shown in the following pages.

EVALUATION FACTOR	CRITERIA ITEMS	WEIGHT (W)	SCORE (S)	WEIGHTED SCORE (W X S)	MAX WT SCORE (W X S_{max})	WT SCORE/MAX WT SCORE
PRODUCT SCOPE & FUNCTION	SCHOOL RECORDS					
	Pre-Registration/Enrollment					
	Create student record	15	___	___		
	- school student I.D.					
	- last name					
	- middle name					
	- first name					
	- birthdate					
	- current grade					
	- sex					
	- feeder school					
	- home address					
	Registration confirmation notice	3	___	___		
	Feeder school confirmation notice	2	___	___		
	TOTAL Pre-Registration/Enrollment	20	___	___	___	___
	Detailed Data Items					
	Student information	25	___	___		
	- school student I.D.					
	- District student I.D.					
	- Alberta Education student I.D.					
	- last name					
	- middle name					
	- first name					
	- birthdate					
	- current grade					
	- sex					
	- feeder school					
	- home address					
	- telephone number					

EVALUATION FACTOR	CRITERIA ITEMS	WEIGHT (W)	SCORE (S)	WEIGHTED SCORE (W X S)	MAX WT SCORE (W X S_{max})	WT SCORE/MAX WT SCORE

	- emergency contact
	    - name
	    - telephone
	- entry information
	    - entry date
	    - registration code
	    - withdrawal code
	- previous schools (2)
	- homeroom instruction
	- counsellor
	- parent/guardian information (up to 4)
	    - name
	    - address
	    - telephone (home and business)
	    - relationship
	    - occupation
	- locker information
	    - number
	    - combination
	- student indebtedness
	- religious denomination
	- program type
	- number of credits earned
	    - this school
	    - other schools
	- academic history
	- travel information
	    - method
	    - distance
	    - bus pass information
	- parking information
	    - driver's licence
	    - licence plate
	    - parking space
	- medical information
	    - disabilities/behaviours
	    - medications
	    - allergies					

EVALUATION FACTOR	CRITERIA ITEMS	WEIGHT (W)	SCORE (S)	WEIGHTED SCORE (W X S)	MAX WT SCORE (W X S_{max})	WT SCORE/MAX WT SCORE
	- date of last medical - physician information - health care number - departure information - date - reason - minimum of 6 user defined fields					
	Instructor Information	5				
	- instructor code - name - address - telephone - social insurance number - language of instruction - certificate number - courses taught - minimum of 6 user defined fields					
	Course information	15				
	- course code (5 character alpha-numeric) - description - pre-and co-requisites (minimum of 4) - must handle"and"/"or"situation - course type - language of instruction - course accreditation - credit value (2 digits) - pass/fail mark - grade					
	TOTAL Detailed Data Items	45				

EVALUATION FACTOR	CRITERIA ITEMS	WEIGHT (W)	SCORE (S)	WEIGHTED SCORE (W X S)	MAX WT SCORE (W X S_{max})	WT SCORE/MAX WT SCORE
	Reports/Inquiries	25	____	____		
	All reports and inquiries should be available for all or a specified range of records, in various sort orders. - class lists - homeroom lists - student name labels - student address labels - parent address labels - student I.D. cards - student data (alphabetical or numerical order) - parent data (alphabetical or numerical order) - instructor data (alphabetical or numerical order) - course data - student phone list - student name list - student grade list - feeder school list - locker information list - student population by instruction type - fee sheets The system should allow production of user-defined reports/inquiries using available data.					
	TOTAL Reports/Inquiries	25	____	____	____	____
	TOTAL SCHOOL RECORDS	90	____	____	____	____

EVALUATION FACTOR	CRITERIA ITEMS	WEIGHT (W)	SCORE (S)	WEIGHTED SCORE (W X S)	MAX WT SCORE (W X S_{max})	WT SCORE/MAX WT SCORE
	SCHEDULING					
	Detailed Data Items					
	- Course code - Course section					
	Manual scheduling (Arena Scheduling)	7	___	___		
	Pre-scheduling					
	Course Requests					
	manual entry	5	___	___		
	automated entry	9	___	___		
	- allow student to specify mandatory/compulsory courses, - preferred courses, preferred alternatives, etc. - allow student to specify preferred section, semester, or instructor					
	Edit and validation of course requests	7	___	___		
	- checking of pre- and co-requisites in the current students' requests as well as history files - capability to override pre- and co-requisites - capability to complete pre-requisite checking for students from other District schools.					
	Pre-scheduling reports	9	___	___		
	- potential conflict matrix — for all or a specified range of courses. Additional selection criteria may be					

EVALUATION FACTOR	CRITERIA ITEMS	WEIGHT (W)	SCORE (S)	WEIGHTED SCORE (W X S)	MAX WT SCORE (W X S_{max})	WT SCORE/MAX WT SCORE
	based on the number of requests or the number of sections. - course tally - students with no requests - student course request list - min/max request list - min/max credit list - verification tickets - arena scheduling labels - students missing compulsory courses - students requesting specific course or group of courses					
	Master schedule builder					
	Capability to build a master schedule					
	manually	6	___	___		
	automatically	9	___	___		
	Capability of handling a variety of Scheduling units	9	___	___		
	- full year - semester - trimester - quartermester - 6 week unit - any combination of the above					
	User defined timetable rotation/tumble	10	___	___		
	Flexible number of periods per day	10	___	___		
	Capability to specify exclusive male or female sections	5	___	___		
	Capability to maintain current and future year/semester master schedules	8	___	___		

EVALUATION FACTOR	CRITERIA ITEMS	WEIGHT (W)	SCORE (S)	WEIGHTED SCORE (W X S)	MAX WT SCORE (W X S_{max})	WT SCORE/MAX WT SCORE
	Scheduling Process					
	User defined scheduling sequence - low grades first - high grades first - A to Z - Z to A	6				
	Unscheduling of no-shows/withdrawals	5				
	Scheduling of individual student or small groups of students	6				
	Capability to reset all students or partially scheduled students	8				
	Capability to lock scheduling assignments for all students or a group of students	8				
	Restart capability	8				
	Course weighting/semester balancing (ensure even course load for students)	8				
	Blocking of courses	7				
	Section balancing	8				
	Class balancing (males-females)	4				
	Capability to keep scheduling open after school start while starting to use the attendance module	9				
	Scheduling Reports/Inquiries	10				
	- student timetables — grid and list format - instructor timetables — grid and list format - room timetables — grid and list format - master schedule - student scheduling conflicts - students partially scheduled - unassigned time					

EVALUATION FACTOR	CRITERIA ITEMS	WEIGHT (W)	SCORE (S)	WEIGHTED SCORE (W X S)	MAX WT SCORE (W X S_{max})	WT SCORE/MAX WT SCORE
	Junior High Scheduling Requirements					
	Homeroom grouping for core subjects	9	____	____		
	Capability of scheduling any course in any combination and number of time periods	10	____	____		
	TOTAL SCHEDULING	200	____	____	____	____
	STUDENT ATTENDANCE					
	Entry of Attendance Data					
	manual entry	5	____	____		
	automated entry	9	____	____		
	Multiple user-defined absence types	8	____	____		
	Capability to record attendance data at various intervals	10	____	____		
	- daily - twice per day - period by period - subject by subject					
	Attendance history	8	____	____		
	- at least ten days detail - cummulative totals					
	Attendance reports/inquiries	10	____	____		
	- student by class - student by subject - student by period					

EVALUATION FACTOR	CRITERIA ITEMS	WEIGHT (W)	SCORE (S)	WEIGHTED SCORE (W X S)	MAX WT SCORE (W X S_{max})	WT SCORE/MAX WT SCORE
	- homeroom attendance					
	- daily summary					
	- weekly summary					
	- monthly summary					
	- multiple absence					
	- capability to produce unexcused absence report for the current day within 30 minutes					
	- the system should allow user defined reports/inquiries using available data					
	TOTAL ATTENDANCE	50	___	___	___	___
	STUDENT MARKS					
	Entry of marks data					
	manual	5	___	___		
	automated	9	___	___		
	Marks data	10	___	___		
	- minimum of 4 term marks plus final mark					
	- letter or percentage grades					
	Student Exams	6	___	___		
	Exam timetable builder					
	- automated					
	- manual					
	Exam Reports/Inquiries					
	- potential exam conflict matrix					
	- exam schedules					

EVALUATION FACTOR	CRITERIA ITEMS	WEIGHT (W)	SCORE (S)	WEIGHTED SCORE (W X S)	MAX WT SCORE (W X S_{max})	WT SCORE/MAX WT SCORE
	Reports/Inquiries	10				
	proof list report cards - marks data - final mark, calculated according to - user-defined form - attendance data - class averages - honour lists - potential failure lists - graduation list					
	TOTAL STUDENT MARKS	40				
	UTILITY FUNCTIONS					
	Backup/Restore	12				
	Security/Controls	8				
	TOTAL UTILITY FUNCTIONS	20				
	GRAND TOTAL, PRODUCT SCOPE AND FUNCTION	400				
EASE OF USE	- flexibility - modular, table driven - help facilities - menu driven	60				
	GRAND TOTAL, EASE OF USE	60				

Detailed SIMS Evaluation Criteria

EVALUATION FACTOR	CRITERIA ITEMS	WEIGHT (W)	SCORE (S)	WEIGHTED SCORE (W X S)	MAX WT SCORE ($W \times S_{max}$)	WT SCORE/MAX WT SCORE

TECHNICAL CONSIDERATIONS	- hardware
	- system software environment
	  - operating system
	  - utilities
	  - database management/system internals/files
	  - networking capabilities
	  - user hooks
	  - modularity of the system
		80				

	GRAND TOTAL, TECHNICAL CONSIDERATIONS	80				

SUPPORT & SERVICES	- local versus where/how far
	- package support and services
	  - software support, custom modifications
	- documentation
	  - user guide, application system, procedural, operations guide, file layouts
	- training
	  - applications system, operational (DP), availability schedule, format, location, prerequisites
	- implementation
	  - training
	  - initialization (conversion, file set-up, output forms)
	  - implementation plan
		70				

	GRAND TOTAL, SUPPORT & SERVICES	70				

EVALUATION FACTOR	CRITERIA ITEMS	WEIGHT (W)	SCORE (S)	WEIGHTED SCORE (W X S)	MAX WT SCORE (W X S_{max})	WT SCORE/MAX WT SCORE
PRODUCT QUALIFICATIONS		80	___	___		
	- package background - reliability - current development status - number of installations - product development plans - release concept, portability, verticality					
	GRAND TOTAL, PRODUCT QUALIFICATIONS	80	☐	☐	☐	☐
VENDOR		70	___	___		

	- Corporate information
	  - background and history
	  - financial performance
	  - employee base
	- Market volatility and vendor stability
	- References
	- Contractual Terms
	  - maintenance
	  - warranty
	  - ownership rights
	  - discount structure/price limit					

	GRAND TOTAL, VENDOR	70	☐	☐	☐	☐

Detailed SIMS Evaluation Criteria

The extreme left hand column of the tables shows the major evaluation factors. The column immediately to the right of this displays the criteria items. Major criteria items are underlined. Below each major criteria item is a list of detailed criteria. The detailed criteria are of two types - those against which the systems under evaluation will be scored and those which are to provide context for the scoring process. Criteria provided for context purposes are identified by a preceding hyphen. Those criteria against which systems were scored can be identified by the presence of an entry in the column marked WEIGHT (weighting factor).

The column entries for the Criteria Tables are defined as follows.

Evaluation Factor - identifies a key area of evaluation and the beginning of a detailed criteria list for that particular factor.

Criteria Item - identifies a feature, process or attribute associated with the factor. The Criteria item column also contains supplementary entries intended to provide an evaluator with a more complete perspective on a particular criteria item being evaluated. Supplementary entries, which are identified by a preceding hyphen, do not have a weight assigned to them.

Weight - is a measure of the relative importance of a criteria item to the user. Summing of weighting factors (or weights) gives a broad perspective of the relative importance of major areas or modules within the context of the entire evaluation. Weights are assignable at the discretion of the user.

Score - is a measure of how well a given criteria is met by a particular alternative. It is suggested that scores be assigned on a simple 0 - 10 scale (or user defined equivalent). Only those items which have weighting factors should be scored.

Weighted Score - this column entry is the product of the weight and the score and is a measure of how well the needs of a user are met on that particular item, area or module.

Maximum Weighted Score - is the product of the weight and the maximum possible score. This would be the weighted score which implies a perfect fit to the needs of the user on a particular criteria item, set thereof, factor, etc.

Weighted Score/Max Weighted Score - this ratio gives a proportional measure of how well user needs are met on a particular item, set thereof, factor, etc.

For those evaluators who may wish to compare raw and weighted scores across product alternatives, a Detailed Scoring Comparison Form was also developed (see Appendix 3). This particular form is identical in format to the Detailed Evaluation Criteria Form but contains only those items which were scorable (i.e. it does not include context related items).

2.2 Evaluation Method

All evaluations were conducted in schools using real and full school data. Wherever possible, live or current school data was used. When this was not possible, data associated with a known reference point was used. While the actual testing was peformed by programmer/systems analysts, school administrators were maximally involved with the key decisions and judgements which guided the evaluations. This was one of the most important reasons why the evaluations were conducted in the schools. All key system capabilities were tested particularly as they related to:

- Data base creation and maintenance
- Pre-scheduling
- Scheduling
- Transition to operational status (and semester turnover)
- Attendance recording and reporting
- Progress recording and reporting
- Report generation
- Utility functions

It is not possible to list all evaluation considerations for all criteria in this report - some key performance considerations, however, were the quality of results achieved, completion times for major procedures and reports and inquiry response times.

During the course of the evaluations, each system was scored against each of the evaluation criteria using a zero to ten point scale. Scores were assigned as overall measures of "performance" against the criteria taking into account all considerations believed to be relevant by the evaluation team.

For example, consider the scheduling process. Both the timing and the quality of the result are critical evaluation considerations. Competitive systems might receive equivalently low scores if, while one produces a high quality result (e.g. high % students completely scheduled) in a very long time frame, the other produces a low quality result in a very short time frame.

In isolation, the mere presence of a particular feature, the sheer speed with which a process could be completed or the high quality of a particular result are not necessarily consistent with the awarding of high scores.

Testing and evaluation was supervised by three different project leaders on the Distributed Systems Team (of Edmonton Public Schools' Information Services). All software systems were evaluated in IBM microcomputer environments. Every attempt was made to maximize objectivity. For example, each system was evaluated by more than one project leader and frequent meetings were held to ensure cross referencing and the sharing of ideas and experiences. Despite this, of course, it is reasonable to expect some subjectivity to exist characteristic of the particular evaluator.

3.0 OVERVIEW OF SYSTEMS EVALUATED

Student Information and Records System (SIRS), developed by a small Alberta based company, underwent initial pilot testing in Redwater School in the County of Sturgeon. The system was initially developed as a pupil records system which included Alberta Education interfaces and with links to a financial information management system. The system evolved with the addition of a scheduler, the development of which was heavily based on the requirements of Redwater School. Close contact was maintained with at least one Edmonton Public School during this particular phase of SIRS' development.

SIRS was originally developed in RM COBOL to run on the NCR Tower Minicomputer and the multi-user ALTOS microcomputer. The system was converted to run on the IBM PC XT microcomputer.

Many of the programs which constitute SIRS have been re-written, particularly those relating to scheduling, to add more function and increase the speed of operation. SIRS is a system which integrates the basic functions relating to school records, student scheduling, attendance and progress tracking and reporting. A SIRS user's group was recently formed to provide input for future product enhancement and development. At the time that this report was produced, there were seven known installations of SIRS (see Appendix 4) all of which are in Alberta. SIRS, on the ALTOS and NCR Tower computers at least, is a multi-user system.

The School System was developed by Columbia Computer Services, a Vancouver based company. Columbia is a company which focuses exclusively on the education market and has almost two decades of design and development experience in student information management systems. The Company has a large North American customer base and has for a number of years (since 1968) offered services to schools (particularly scheduling) through a mainframe based service bureau approach (time sharing). Hundreds of North American schools are known to have subscribed to this service. Columbia is now in the process of phasing out its mainframe based services to customers in favour of a microcomputer based product which it has developed, called The School System. The School System features an integrated approach to school records, student scheduling, attendance and progress tracking and reporting. This multi-user system is written in the C language and was developed specifically to run on the IBM family of microcomputers. To date, The School System has been installed in more than 200 schools.

Computer Educational Management Accounting System was developed by a small Toronto based company called Computerlib. This product evolved from a product called EMAS which was developed to be marketed on the IBM System 34 Mini-computer. Initially, CEMAS ran on the Xerox microcomputer (and also, the Radio Shack microcomputer) and was subsequently converted, with some re-design and re-development, to run on the IBM PC and PC/XT. CEMAS, which was developed in a mixed language environment (including the PASCAL and C

Languages), was the first microcomputer based product that we evaluated. The IBM PC version of CEMAS was an immature product at the time of its evaluation by the Team. During the period of our involvement with CEMAS we became aware of only two or three other attempts to install the product operationally. We are not aware of the current number of installations of this product. As with SIRS and TSS, CEMAS addresses the four major functions of schools records, student scheduling, attendance and progress tracking and reporting. At the time of the evaluation, CEMAS did not offer multi-user capability.

Since completing the formal evaluations of the three microcomputer based SIMS in February 1985, there have been a number of product announcements and system enhancements. Appendix 5 provides an overview of major new developments that are known to us.

4.0 PRODUCT EVALUATIONS - SENIOR HIGH SCHOOL PERSPECTIVE

As stated previously, all products were evaluated in IBM microcomputer environments and at school sites. Though multi-user capability is considered to be important (particularly for the larger schools), testing of this capability was not included within the scope of these evaluations. From the product scope and function perspective, systems were evaluated in a stand-alone fashion. Two of the products offered multi-user capability at the time of evaluation notably SIRS and TSS. The developers of CEMAS indicated that multi-user capability was definitely included within the scope of their product development plans. It should be noted that scores of zero were used to indicate total absence of a capability or feature.

4.1 Evaluation of SIRS

4.1.1 Testing Environment and Conditions

The initial phase of testing was conducted using Jasper Place School - a school of about 1750 students which offers a wide variety of programs including vocational. An IBM PC XT complemented by a 10 Mb expansion unit and an Okidata Microline 84 printer were used for this phase. The second phase was conducted at Eastglen School - a school of 775 students. Second phase testing was conducted, using 2 different IBM personal computers, specifically, an IBM PC XT/370 with 10 Mb expansion unit and an IBM PC AT with a built in 20Mb hard disk. Two different printers, the Okidata Microline 84 and an Epson MX 80 were used.

It was a requirement that all systems evaluated be able to run on IBM microcomputers. With this condition clearly defined, MIG converted its NCR/Altos based system to run on the IBM microcomputer in order that it be included among the products to be evaluated. MIG advised the evaluation team that not all of the many programs which constituted SIRS were converted and that we might also expect performance degradation (particularly speed of execution) as a general consequence of the conversion to IBM format.

4.1.2 Evaluation Results and Observations

The following tables show the outcome of the quantitative evaluation of SIRS against the detailed criteria.

EVALUATION FACTOR	CRITERIA ITEMS	WEIGHT (W)	SCORE (S)	WEIGHTED SCORE (W X S)	MAX WT SCORE (W X S_{max})	WT SCORE/MAX WT SCORE
PRODUCT SCOPE & FUNCTION	**SCHOOL RECORDS**					
	Pre-Registration/Enrollment					
	Create student record	15	8	120		
	- school student I.D. - last name - middle name - first name - birthdate - current grade - sex - feeder school - home address					
	Registration confirmation notice	3	2	6		
	Feeder school confirmation notice	2	0	0		
	TOTAL Pre-Registration/Enrollment	20	10/30	126	200	.63
	Detailed Data Items					
	Student information	25	8	200		
	- school student I.D. - District student I.D. - Alberta Education student I.D. - last name - middle name - first name - birthdate - current grade - sex - feeder school - home address - telephone number					

EVALUATION FACTOR	CRITERIA ITEMS	WEIGHT (W)	SCORE (S)	WEIGHTED SCORE (W X S)	MAX WT SCORE (W X S_{max})	WT SCORE/MAX WT SCORE
	- emergency contact - name - telephone - entry information - entry date - registration code - withdrawal code - previous schools (2) - homeroom instruction - counsellor - parent/guardian information (up to 4) - name - address - telephone (home and business) - relationship - occupation - locker information - number - combination - student indebtedness - religious denomination - program type - number of credits earned - this school - other schools - academic history - travel information - method - distance - bus pass information - parking information - driver's licence - licence plate - parking space - medical information - disabilities/behaviours - medications - allergies					

EVALUATION FACTOR	CRITERIA ITEMS	WEIGHT (W)	SCORE (S)	WEIGHTED SCORE (W X S)	MAX WT SCORE (W X S_{max})	WT SCORE/MAX WT SCORE
	- date of last medical					
	- physician information					
	- health care number					
	- departure information					
	- date					
	- reason					
	- minimum of 6 user defined fields					
	Instructor Information	5	7	35		
	- instructor code					
	- name					
	- address					
	- telephone					
	- social insurance number					
	- language of instruction					
	- certificate number					
	- courses taught					
	- minimum of 6 user defined fields					
	Course information	15	8	120		
	- course code (5 character alpha-numeric)					
	- description					
	- pre-and co-requisites (minimum of 4)					
	- must handle"and"/"or"situation					
	- course type					
	- language of instruction					
	- course accreditation					
	- credit value (2 digits)					
	- pass/fail mark					
	- grade					
	TOTAL Detailed Data Items	45	23/30	355	450	.788

EVALUATION FACTOR	CRITERIA ITEMS	WEIGHT (W)	SCORE (S)	WEIGHTED SCORE (W X S)	MAX WT SCORE (W X S_{max})	WT SCORE/MAX WT SCORE
	Reports/Inquiries	25	6	150		
	All reports and inquiries should be available for all or a specified range of records, in various sort orders. - class lists - homeroom lists - student name labels - student address labels - parent address labels - student I.D. cards - student data (alphabetical or numerical order) - parent data (alphabetical or numerical order) - instructor data (alphabetical or numerical order) - course data - student phone list - student name list - student grade list - feeder school list - locker information list - student population by instruction type - fee sheets					
	The system should allow production of user-defined reports/inquiries using available data.					
	TOTAL Reports/Inquiries	25	6	150	250	.60
	TOTAL SCHOOL RECORDS	90	39/70	631	900	.70

EVALUATION FACTOR	CRITERIA ITEMS	WEIGHT (W)	SCORE (S)	WEIGHTED SCORE (W X S)	MAX WT SCORE (W X S_{max})	WT SCORE/MAX WT SCORE
	SCHEDULING					
	Detailed Data Items					
	- Course code - Course section					
	Manual scheduling (Arena Scheduling)	7	9	63		
	Pre-scheduling					
	Course Requests					
	manual entry	5	7	35		
	automated entry	9	4	36		
	- allow student to specify mandatory/ compulsory courses, - preferred courses, preferred alternatives, etc. - allow student to specify preferred section, semester, or instructor					
	Edit and validation of course requests	7	9	63		
	- checking of pre- and co-requisites in the current students' requests as well as history files - capability to override pre- and co-requisites - capability to complete pre-requisite checking for students from other District schools.					
	Pre-scheduling reports	9	9	81		
	- potential conflict matrix — for all or a specified range of courses. Additional selection criteria may be					

EVALUATION FACTOR	CRITERIA ITEMS	WEIGHT (W)	SCORE (S)	WEIGHTED SCORE (W X S)	MAX WT SCORE (W X S_{max})	WT SCORE/MAX WT SCORE
	based on the number of requests or the number of sections.					
	- course tally					
	- students with no requests					
	- student course request list					
	- min/max request list					
	- min/max credit list					
	- verification tickets					
	- arena scheduling labels					
	- students missing compulsory courses					
	- students requesting specific course or group of courses					
	Master schedule builder					
	Capability to build a master schedule					
	manually	6	7	42		
	automatically	9	0	0		
	Capability of handling a variety of Scheduling units	9	8	72		
	- full year					
	- semester					
	- trimester					
	- quartermester					
	- 6 week unit					
	- any combination of the above					
	User defined timetable rotation/tumble	10	8	80		
	Flexible number of periods per day	10	8	80		
	Capability to specify exclusive male or female sections	5	8	40		
	Capability to maintain current and future year/semester master schedules	8	10	80		

EVALUATION FACTOR	CRITERIA ITEMS	WEIGHT (W)	SCORE (S)	WEIGHTED SCORE (W X S)	MAX WT SCORE (W X S_{max})	WT SCORE/MAX WT SCORE
	Scheduling Process					
	User defined scheduling sequence - low grades first - high grades first - A to Z - Z to A	6	7	42		
	Unscheduling of no-shows/withdrawals	5	9	45		
	Scheduling of individual student or small groups of students	6	0	0		
	Capability to reset all students or partially scheduled students	8	0	0		
	Capability to lock scheduling assignments for all students or a group of students	8	0	0		
	Restart capability	8	0	0		
	Course weighting/semester balancing (ensure even course load for students)	8	7	56		
	Blocking of courses	7	8	56		
	Section balancing	8	9	72		
	Class balancing (males-females)	4	8	32		
	Capability to keep scheduling open after school start while starting to use the attendance module	9	0	0		
	Scheduling Reports/Inquiries	10	9	90		
	- student timetables — grid and list format - instructor timetables — grid and list format - room timetables — grid and list format - master schedule - student scheduling conflicts - students partially scheduled - unassigned time					

EVALUATION FACTOR	CRITERIA ITEMS	WEIGHT (W)	SCORE (S)	WEIGHTED SCORE (W X S)	MAX WT SCORE (W X S_{max})	WT SCORE/MAX WT SCORE
	Junior High Scheduling Requirements					
	Homeroom grouping for core subjects					
	Capability of scheduling any course in any combination and number of time periods					
	TOTAL SCHEDULING	181	144/240	1065	1810	.58
	STUDENT ATTENDANCE					
	Entry of Attendance Data					
	manual entry	5	9	45		
	automated entry	9	0	0		
	Multiple user-defined absence types	8	8	64		
	Capability to record attendance data at various intervals	10	9	90		
	- daily - twice per day - period by period - subject by subject					
	Attendance history	8	7	56		
	- at least ten days detail - cummulative totals					
	Attendance reports/inquiries	10	7	70		
	- student by class - student by subject - student by period					

EVALUATION FACTOR	CRITERIA ITEMS	WEIGHT (W)	SCORE (S)	WEIGHTED SCORE (W X S)	MAX WT SCORE (W X S_{max})	WT SCORE/MAX WT SCORE
	- homeroom attendance					
	- daily summary					
	- weekly summary					
	- monthly summary					
	- multiple absence					
	- capability to produce unexcused absence report for the current day within 30 minutes					
	- the system should allow user defined reports/inquiries using available data					
	TOTAL ATTENDANCE	50	40/60	325	500	.65
	STUDENT MARKS					
	Entry of marks data					
	manual	5	8	40		
	automated	9	0	0		
	Marks data	10	8	80		
	- minimum of 4 term marks plus final mark					
	- letter or percentage grades					
	Student Exams	6	0	0		
	Exam timetable builder					
	- automated					
	- manual					
	Exam Reports/Inquiries					
	- potential exam conflict matrix					
	- exam schedules					

EVALUATION FACTOR	CRITERIA ITEMS	WEIGHT (W)	SCORE (S)	WEIGHTED SCORE (W X S)	MAX WT SCORE (W X S_{max})	WT SCORE/MAX WT SCORE
	Reports/Inquiries	10	8	80		
	proof list report cards - marks data - final mark, calculated according to user-defined formula attenandance data - class averages - honour lists - potential failure lists - graduation list					
	TOTAL STUDENT MARKS	40	24/50	200	400	.5
	UTILITY FUNCTIONS					
	Backup/Restore	12	8	96		
	Security/Controls	8	2	16		
	TOTAL UTILITY FUNCTIONS	20	10/20	112	200	.56
	GRAND TOTAL, PRODUCT SCOPE AND FUNCTION	381	257/440	2333	3810	.6123
EASE OF USE	- flexibility - modular, table driven - help facilities - menu driven	60	6	360		
	GRAND TOTAL, EASE OF USE	60	6	360	600	.6

EVALUATION FACTOR	CRITERIA ITEMS	WEIGHT (W)	SCORE (S)	WEIGHTED SCORE (W X S)	MAX WT SCORE (W X S_{max})	WT SCORE/MAX WT SCORE
TECHNICAL CONSIDERATIONS	- hardware - system software environment - operating system - utilities - database management/system internals/files - networking capabilities - user hooks - modularity of the system	80	6	480		
	GRAND TOTAL, TECHNICAL CONSIDERATIONS	**80**	**6**	**480**	**800**	**.6**
SUPPORT & SERVICES	- local versus where/how far - package support and services - software support, custom modifications - documentation - user guide, application system, procedural, operations guide, file layouts - training - applications system, operational (DP), availability schedule, format, location, prerequisites - implementation - training - initialization (conversion,file set-up, output forms) - implementation plan	70	7	490		
	GRAND TOTAL, SUPPORT & SERVICES	**70**	**7**	**490**	**700**	**.7**

EVALUATION FACTOR	CRITERIA ITEMS	WEIGHT (W)	SCORE (S)	WEIGHTED SCORE (W X S)	MAX WT SCORE (W X S_{max})	WT SCORE/MAX WT SCORE
PRODUCT QUALIFICATIONS		80	6	480		
	- package background - reliability - current development status - number of installations - product development plans - release concept, portability, verticality					
	GRAND TOTAL, PRODUCT QUALIFICATIONS	80	6	480	800	.6
VENDOR		70	7	490		
	- Corporate information - background and history - financial performance - employee base - Market volatility and vendor stability - References - Contractual Terms - maintenance - warranty - ownership rights - discount structure/price limit					
	GRAND TOTAL, VENDOR	70	7	490	700	.7

Observations

The following comments and observations are offered in support of the quantitative evaluation of SIRS.

(A) Scope and Function

School Records: Positive points include a 15 character identity field which facilitates the link to Edmonton Public School's mainframe based pupil records system; family linking capabilities which means only one contact for several students within a family; proper pre- and co-requisite checking with the capability to override this when necessary; good Alberta Education field for statutory reporting; existence of a link between student and course fees to an MIG financial system which includes student fee invoices.

Negative points include absence of user definable fields (considered to be very important); absence of some less important fields; absence of registration and feeder school confirmation; use of artificial numerical codes for student requests, probably introduced to accomplish course grouping or linking; use of numeric codes in areas such as the instructor file; no user defined reports.

Scheduling: The scheduling function is capable of working with both semestered and non-semestered versions of the same course using the same student request. In addition, good tally reports and conflict matrices are available; flexible class placement is possible anywhere within the period by day matrix; there is a capability to specify, for each request, preferred semester and alternate course information; quite acceptable class balancing is achieved with results obtained comparable to those achieved using the mainframe and minicomputers.

On the negative side, use of the artificial numeric code as a course request rather than the course code itself tends to complicate the scheduling process; there is a necessity to run several time consuming edit reports before each scheduling run; it is necessary to completely close scheduling before starting attendance and other general school functions; there is a long processing time when sheduling large schools; necessary information is not printed with partial schedules which could be used to resolve conflicts.

Attendance: The Attendance module is fairly acceptable with flexible user defined codes which may be classified as "accumulating" types and "non-accumulating" types for attendance letter generation; there is the capability of generating 8 different letters to parents which are automatically prepared when attendance problems pass certain levels; detailed period and class attendance is maintained for the whole year; generation of attendance collection forms is good as are facilities for data entry.

Negative points include too much detail on absences in most reports; codes for absence reasons are numeric rather than the more meaningful alphabetic codes used in other systems; the generation of collection registers could be slow for a large school especially if class lists are to be alphabetic which seems to be the norm.

Student Marks: The marks system is adequate with a structure consistent with Alberta Education requirements and a reflection of the current move towards departmental exams; the format of student report data is consistent with current EPSB reports; the required final marks and attendance summary is automatically transferred to the academic history segment for use in pre-requisite checking.

Some poor features include the absence of automatic marks entry; all marks are stored as percentage scores even if awarded as pass/fail or A,B,C, etc; there are no user definable marks storage nor calculation modules which can store a large number of intermediate marks required to calculate a report card mark.

Utility Functions: Backup and Restore are menu driven and are considered normal and acceptable. Security was not present on the evaluated system with the exception of access to some technical system setup parameter files.

(B) Ease of Use

The system is not flexible in the sense of user defined fields, user defined reporting, user controllable import and export capabilities. The user is bound by a menu driven system which in itself does not allow much diversion from system defined procedures.

No help facilities are availble in SIRS.

(C) Technical Considerations

Hardware: The system was designed to run on an ALTOS multi-user microcomputer, or an NCR Tower minicomputer, hence the performance and overall functionality of the package was adversely affected after being converted to run on the IBM PC family of computers.

Software: The software was written in RM COBOL and operates through semi-interpreted object modules and a run-time system.

There is extra information (JCL type statements on the screen) which tends to "clutter" the screen and break the fluid movement from screen to screen and menu to menu.

(D) Support and Services

Positive points include the fact that the company and product are local; there is a relatively small customer base and the product is still in development which means that the vendor is willing to support the product well and customize; the vendor is very forthcoming with respect to system capabilities and explanations as to how functions are performed; there is a willingness to write custom programs to allow data downloading from central databases; the vendor readily became involved with implementation plans for testing purposes and responded rapidly to queries and software problems.

On the negative side, documentation is very poor, basically a collection of screen dumps with practically no explanation; only very minimal formal training was available - the philosophy seemed to be to try to work with the system and the company will help as problems arise; the small size of the company, the limited number of installations of SIRS and the potential impact of staff changes on product support are considered significant reasons for concern.

(E) Product Qualifications

The package was developed for the Alberta market with close contact with Alberta Education. Initial implementation, testing and direction for modifications and the development of the scheduling module were influenced by at least one Edmonton Public School.

The current development plans are based on ALTOS/NCR versions and revolve around:

- adding function and speed to the scheduling area (this is badly needed).
- interfacing with the NCS SENTRY 3000 form scanner.
- interfacing to "surveyor" type auto dialing systems.

The current user base includes seven Alberta installations based on information available in January 1985.

(F) Vendor

The vendor is a relatively small company with some local customers. The company is based in St. Albert and developed the system as an adjunct to a financial package. The vendor sells hardware as well as software and offers a good price structure on the SIRS system.

Unfortunately, the combination of small size and lack of good references works against the vendor. Similarly, limited staff and vendor stability are minus points.

4.1.3 System Performance, Strengths and Weaknesses - SIRS (MIG)

Key Performance Indicators

School Test Site	Parameter	IBM PC/XT	IBM PC/AT
Eastglen CHS	Scheduler - Time	-	2:30 hours
	Scheduler - Performance	-	62%
	Scheduler - Expected Perf.	-	65%
	Timetables	-	7:00 hours (list format)
	Conflict Matrix	4:10 hours	-
	Course Tally	0:50 hours	-
	Master Schedule	-	2:15 hours
	Class Lists	-	5:00 hours (non-alphabetic)
	Attendance Registers	-	4:00 hours
	Marks Registers	-	6:20 hours
	Student Registers	-	1:00 hours
Jasper Place CHS	Scheduler - Time	46 hours	19 hours
	Scheduler - Performance	85%	85%
	Scheduler - Expected Perf.	85%	85%

Jasper Place CHS	1846 students
Eastglen CHS	775 students

(All timings are in hours: minutes)

System Strengths:

- Good prerequisite checking before and after scheduling, however these act as a warning only and do not affect loading, thus desired exceptions can be scheduled.
- Good fee information held at the student and course level for preparation of fee invoices.
- A convenient link to the mainframe database via the 15 character field for the Student. ID. #.
- Locally developed: thus changes in Alberta Education requirements should be more easily accommodated.
  - Changes might be more likely to be considered
  - A number of reports specifically designed for Alberta Education are present. (Possibly not a great advantage to those who report at the district level - rather than at the school level)
- Automatic generation of attendance letters (8 user defined types) based on user defined amount of absences.
- SIRS is known to run in a multiuser (non IBM PC) environment and has print spooling capabilities.

System Weaknesses:

- Poor performance on IBM equipment (primarily speed).
- Screen organization and readability not as good as other systems. Frequent display of JCL type statements and difficulty in finding the appropriate field or menu selection.
- Lack of automated input on IBM equipment at this point in time.
- Use of a 3 digit request code for scheduling purposes causes user confusion and tends to make the scheduling process slow to edit and run.
- Lack of any user defined fields which will result in the need for continuing modifications at the vendor level.

4.2 Evaluation of TSS

4.2.1 Testing Environment and Conditions

Two separate project teams, each under a project leader, evaluated The School System at a number of senior high schools. In all cases, IBM PC/AT and IBM PC/XT computers were used for the work.

Team 1:	Initial testing was on an IBM PC/XT computer. Final testing took place on IBM PC/AT computers on full sets of data for Jasper Place and W.P. Wagner schools. The configuration of the IBM PC/AT system in each case was: 512 kb memory, 20 Mb hard disc, PC DOS 3.00 operating system. All reports were printed on OKIDATA Microline 84 printers.
Team 2:	The School System was tested at three schools, 2 Senior High and one Junior High (see section 6.0 for details of the Junior High School evaluation). At J. Percy Page school, an IBM PC connected onto the Davong Multilink network was used with a 5 Mbyte user volume and 448 kb memory. Printing was carried out on a General Electric Genicom (300 characters per second) printer. At Victoria Composite High school, an IBM PC/AT was used with 20 Mb hard disk storage, 512 kbytes memory and an OKIDATA 84 printer.

4.2.2 Evaluation Results and Observations

The following tables show the outcome of the quantitative evaluation of Columbia's "The School System" against the detailed criteria. The results and the following observations are a consensus of information from the two teams which undertook the evaluations.

EVALUATION FACTOR	CRITERIA ITEMS	WEIGHT (W)	SCORE (S)	WEIGHTED SCORE (W X S)	MAX WT SCORE (W X S_{max})	WT SCORE/MAX WT SCORE
PRODUCT SCOPE & FUNCTION	**SCHOOL RECORDS**					
	Pre-Registration/Enrollment					
	Create student record	15	6	90		
	- school student I.D. - last name - middle name - first name - birthdate - current grade - sex - feeder school - home address					
	Registration confirmation notice	3	5	15		
	Feeder school confirmation notice	2	2	4		
	TOTAL Pre-Registration/Enrollment	20	13/30	109	200	.545
	Detailed Data Items					
	Student information	25	8	200		
	- school student I.D. - District student I.D. - Alberta Education student I.D. - last name - middle name - first name - birthdate - current grade - sex - feeder school - home address - telephone number					

EVALUATION FACTOR	CRITERIA ITEMS	WEIGHT (W)	SCORE (S)	WEIGHTED SCORE (W X S)	MAX WT SCORE ($W \times S_{max}$)	WT SCORE/MAX WT SCORE

	- emergency contact
	  - name
	  - telephone
	- entry information
	  - entry date
	  - registration code
	  - withdrawal code
	- previous schools (2)
	- homeroom instruction
	- counsellor
	- parent/guardian information (up to 4)
	  - name
	  - address
	  - telephone (home and business)
	  - relationship
	  - occupation
	- locker information
	  - number
	  - combination
	- student indebtedness
	- religious denomination
	- program type
	- number of credits earned
	  - this school
	  - other schools
	- academic history
	- travel information
	  - method
	  - distance
	  - bus pass information
	- parking information
	  - driver's licence
	  - licence plate
	  - parking space
	- medical information
	  - disabilities/behaviours
	  - medications
	  - allergies					

EVALUATION FACTOR	CRITERIA ITEMS	WEIGHT (W)	SCORE (S)	WEIGHTED SCORE (W X S)	MAX WT SCORE (W X S_{max})	WT SCORE/MAX WT SCORE
	- date of last medical - physician information - health care number - departure information - date - reason - minimum of 6 user defined fields					
	Instructor Information	5	3	15		
	- instructor code - name - address - telephone - social insurance number - language of instruction - certificate number - courses taught - minimum of 6 user defined fields					
	Course information	15	8	120		
	- course code (5 character alpha-numeric) - description - pre-and co-requisites (minimum of 4) - must handle"and"/"or"situation - course type - language of instruction - course accreditation - credit value (2 digits) - pass/fail mark - grade					
	TOTAL Detailed Data Items	45	19/30	335	450	.744

EVALUATION FACTOR	CRITERIA ITEMS	WEIGHT (W)	SCORE (S)	WEIGHTED SCORE (W X S)	MAX WT SCORE (W X S_{max})	WT SCORE/MAX WT SCORE
	Reports/Inquiries	25	6	150		
	All reports and inquiries should be available for all or a specified range of records, in various sort orders. - class lists - homeroom lists - student name labels - student address labels - parent address labels - student I.D. cards - student data (alphabetical or numerical order) - parent data (alphabetical or numerical order) - instructor data (alphabetical or numerical order) - course data - student phone list - student name list - student grade list - feeder school list - locker information list - student population by instruction type - fee sheets					
	The system should allow production of user-defined reports/inquiries using available data.					
	TOTAL Reports/Inquiries	25	6	150	250	.6
	TOTAL SCHOOL RECORDS	90	38/70	594	900	.66

EVALUATION FACTOR	CRITERIA ITEMS	WEIGHT (W)	SCORE (S)	WEIGHTED SCORE (W X S)	MAX WT SCORE (W X S_{max})	WT SCORE/MAX WT SCORE
	SCHEDULING					
	Detailed Data Items					
	- Course code - Course section					
	Manual scheduling (Arena Scheduling)	7	9	63		
	Pre-scheduling					
	Course Requests					
	manual entry	5	9	45		
	automated entry	9	9	81		
	- allow student to specify mandatory/ compulsory courses, - preferred courses, preferred alternatives, etc. - allow student to specify preferred section, semester, or instructor					
	Edit and validation of course requests	7	6	42		
	- checking of pre- and co-requisites in the current students' requests as well as history files - capability to override pre- and co-requisites - capability to complete pre-requisite checking for students from other District schools.					
	Pre-scheduling reports	9	8	72		
	- potential conflict matrix — for all or a specified range of courses. Additional selection criteria may be					

EVALUATION FACTOR	CRITERIA ITEMS	WEIGHT (W)	SCORE (S)	WEIGHTED SCORE (W X S)	MAX WT SCORE (W X S_{max})	WT SCORE/MAX WT SCORE
	based on the number of requests or the number of sections.					
	- course tally					
	- students with no requests					
	- student course request list					
	- min/max request list					
	- min/max credit list					
	- verification tickets					
	- arena scheduling labels					
	- students missing compulsory courses					
	- students requesting specific course or group of courses					
	Master schedule builder					
	Capability to build a master schedule					
	manually	6	8	48		
	automatically	9	0	0		
	Capability of handling a variety of Scheduling units	9	6	54		
	- full year					
	- semester					
	- trimester					
	- quartermester					
	- 6 week unit					
	- any combination of the above					
	User defined timetable rotation/tumble	10	10	100		
	Flexible number of periods per day	10	10	100		
	Capability to specify exclusive male or female sections	5	4	20		
	Capability to maintain current and future year/semester master schedules	8	3	24		

EVALUATION FACTOR	CRITERIA ITEMS	WEIGHT (W)	SCORE (S)	WEIGHTED SCORE (W X S)	MAX WT SCORE (W X S_{max})	WT SCORE/MAX WT SCORE
	Scheduling Process					
	User defined scheduling sequence	6	5	30		
	- low grades first					
	- high grades first					
	- A to Z					
	- Z to A					
	Unscheduling of no-shows/withdrawals	5	9	45		
	Scheduling of individual student or small groups of students	6	8	48		
	Capability to reset all students or partially scheduled students	8	10	80		
	Capability to lock scheduling assignments for all students or a group of students	8	5	40		
	Restart capability	8	0	0		
	Course weighting/semester balancing (ensure even course load for students)	8	7	56		
	Blocking of courses	7	9	63		
	Section balancing	8	8	64		
	Class balancing (males-females)	4	7	28		
	Capability to keep scheduling open after school start while starting to use the attendance module	9	9	81		
	Scheduling Reports/Inquiries	10	7	70		
	- student timetables — grid and list format					
	- instructor timetables — grid and list format					
	- room timetables — grid and list format					
	- master schedule					
	- student scheduling conflicts					
	- students partially scheduled					
	- unassigned time					

EVALUATION FACTOR	CRITERIA ITEMS	WEIGHT (W)	SCORE (S)	WEIGHTED SCORE (W X S)	MAX WT SCORE (W X S_{max})	WT SCORE/MAX WT SCORE
	Junior High Scheduling Requirements					
	Homeroom grouping for core subjects					
	Capability of scheduling any course in any combination and number of time periods					
	TOTAL SCHEDULING	181	166/240	1254	1810	.6928
	STUDENT ATTENDANCE					
	Entry of Attendance Data					
	manual entry	5	7	35		
	automated entry	9	8	72		
	Multiple user-defined absence types	8	9	72		
	Capability to record attendance data at various intervals	10	9	90		
	- daily - twice per day - period by period - subject by subject					
	Attendance history	8	9	72		
	- at least ten days detail - cummulative totals					
	Attendance reports/inquiries	10	6	60		
	- student by class - student by subject - student by period					

EVALUATION FACTOR	CRITERIA ITEMS	WEIGHT (W)	SCORE (S)	WEIGHTED SCORE (W X S)	MAX WT SCORE ($W \times S_{max}$)	WT SCORE/MAX WT SCORE
	- homeroom attendance - daily summary - weekly summary - monthly summary - multiple absence - capability to produce unexcused absence report for the current day within 30 minutes - the system should allow user defined reports/inquiries using available data					
	TOTAL ATTENDANCE	50	48/60	401	500	.802
	STUDENT MARKS					
	Entry of marks data					
	manual	5	8	40		
	automated	9	8	72		
	Marks data	10	8	80		
	- minimum of 4 term marks plus final mark - letter or percentage grades					
	Student Exams	6	0	0		
	Exam timetable builder					
	- automated - manual					
	Exam Reports/Inquiries					
	- potential exam conflict matrix - exam schedules					

EVALUATION FACTOR	CRITERIA ITEMS	WEIGHT (W)	SCORE (S)	WEIGHTED SCORE (W X S)	MAX WT SCORE (W X S_{max})	WT SCORE/MAX WT SCORE
	Reports/Inquiries	10	6	60		
	proof list report cards - marks data - final mark, calculated according to user-defined formula attenandance data - class averages - honour lists - potential failure lists - graduation list					
	TOTAL STUDENT MARKS	40	30/50	252	400	.63
	UTILITY FUNCTIONS					
	Backup/Restore	12	8	96		
	Security/Controls	8	0	0		
	TOTAL UTILITY FUNCTIONS	20	8/20	96	200	.48
	GRAND TOTAL, PRODUCT SCOPE AND FUNCTION	381	290/440	2597	3810	.6816
EASE OF USE	- flexibility - modular, table driven - help facilities - menu driven	60	8	480		
	GRAND TOTAL, EASE OF USE	60	8	480	600	.80

EVALUATION FACTOR	CRITERIA ITEMS	WEIGHT (W)	SCORE (S)	WEIGHTED SCORE (W X S)	MAX WT SCORE (W X S_{max})	WT SCORE/MAX WT SCORE
TECHNICAL CONSIDERATIONS	- hardware	80	9	720		
	- system software environment - operating system - utilities - database management/system internals/files - networking capabilities - user hooks - modularity of the system					
	GRAND TOTAL, TECHNICAL CONSIDERATIONS	80	9	720	800	.90
SUPPORT & SERVICES	- local versus where/how far	70	8	560		
	- package support and services - software support, custom modifications					
	- documentation - user guide, application system, procedural, operations guide, file layouts					
	- training - applications system, operational (DP), availability schedule, format, location, prerequisites					
	- implementation - training - initialization (conversion,file set-up, output forms) - implementation plan					
	GRAND TOTAL, SUPPORT & SERVICES	70	8	560	700	.8

EVALUATION FACTOR	CRITERIA ITEMS	WEIGHT (W)	SCORE (S)	WEIGHTED SCORE (W X S)	MAX WT SCORE (W X S_{max})	WT SCORE/MAX WT SCORE
PRODUCT QUALIFICATIONS		80	9	720		
	- package background - reliability - current development status - number of installations - product development plans - release concept, portability, verticality					
	GRAND TOTAL, PRODUCT QUALIFICATIONS	**80**	**9**	**720**	**800**	**.9**
VENDOR		70	8	560		
	- Corporate information - background and history - financial performance - employee base - Market volatility and vendor stability - References - Contractual Terms - maintenance - warranty - ownership rights - discount structure/price limit					
	GRAND TOTAL, VENDOR	**70**	**8**	**560**	**700**	**.8**

Observations

The following comments and observations are offered in support of the quantitative evaluation of TSS.

(A) Product Scope and Function

Pre-Registration: There is no distinct pre-registration function, rather, it is part of the enrolment function. Registration confirmation notices are not mailable. However, the pre-registration of a student, even though it requires two screens, can be done very expediently.

Detailed Data Items: Demographic data is good although the program does not handle middle names, the 15 character I.D., future year grade or academic history.

Instructor information is minimal - only name, I.D. number and alpha-numeric instructor code are provided. However, this information is sufficient for use by this system.

Course information is adequate and pre- and co-requisites are checked at scheduling time which makes for speedy data entry. There is no limit on the number of pre- and co-requisites. Some difficulties occur with courses that are offered in both full year and semesters.

Reports/Inquiries: The package lacks some reports especially student I.D. cards and fee sheets but overall has a very comprehensive repertoire. In addition, we were unable to obtain reports for names of students in alphabetical or numeric order. The (future release) Report Writer should alleviate most of these problems although it should be noted here that scores reflect the current status of the product.

Scheduling: On the positive side, the system provides both manual and automated entry of course selections. The only minor problem is that duplicate course requests are not detected.

Pre- and co-requisites are not checked in the academic history and they can only be over-ridden at scheduling time.

The Automatic Course selection feature provides a powerful tool for purposes such as:

- course blocking
- separation into male/female only sections
- withdrawing students from cancelled courses.

On the negative side, the conflict matrix is presented in an unsatisfactory format and there is no capability to automatically build a master timetable. The package can deal only with certain combinations of courses, for example no units smaller than quarters, not both tri- and quarter-mesters.

Overall, Columbia provides excellent flexibility in terms of the timetable rotation and tumble, and the number of periods per day. There is a capability to maintain both current and future year master schedules and the ability to "roll over" future year to current year is also provided. In addition, the scheduling process runs extremely quickly and produces excellent results although it does not allow the user to define scheduling sequence, however grade order can be specified (the algorithm used makes this feature unnecessary).

The scheduler provides the capability to schedule groups of students without affecting the timetables of the remainder and it does provide the ability to schedule any individual student.

Scheduling Reports: Student timetables are available in grid format only. List timetables are not available in a form suitable for distribution to students.

Attendance: Manual entry of attendance data requires the use of two screens which is awkward. Automated entry of attendance data is supported and is used currently at one of the pilot sites, although no reason codes (reasons for absence) can be entered from the scan forms.

On the positive side, the system provides excellent attendance history - full year in detail plus cumulative totals. The attendance module is capable of recording absence data daily, twice daily and period by period.

The attendance reports available are quite comprehensive. The Report Writer package under development will enhance the reporting capability in this area.

Student Marks: Manual and automated entry of marks data is supported and the system allows up to 10 term marks, letter or percentage grades or a mixture. Report cards are produced reasonably quickly and seem adequate for school needs.

No exam timetable facilities are provided and while basic reports are available, more detailed reports are required.

Utility Functions: The system provides a good backup and restore utility. It also provides an excellent user ID/password security system.

(B) Ease of Use

The system is very flexible allowing any timetable rotation and up to 4 semesters. It allows import and export of data to the main database using File Builder/Virtual Scan input.

All functions are driven from concise menus; there is consistent cursor control and function key handling. Screen response is fast and error messages are generally good.

On the negative side, there is no online help facility, but the documentation is excellent.

The documentation provides step by step descriptions of the functions which must be performed in order to run The School System.

(C) Technical Considerations

A multi-user version of the system is available. The master terminal is a PC/XT or PC/AT computer with dumb terminals for remaining stations. Two users can be supported on the IBM PC/XT and up to 4 users on the IBM PC/AT.

The School System is a modular, integrated system written entirely in "C" with extensive use of BAT batch files to control the flow of operations. It has a relatively open design with virtual scan forms and File Builder facilities to provide for various enhancements to the system.

(D) Support and Services

The company is based in Vancouver with excellent telephone support:

- calls are returned promptly
- the company is always willing to help whoever calls
- the company keeps in contact until a problem is solved.

In addition, the company seems capable of performing needed maintenance tasks.

The design of the system allows some user modification and the documentation is excellent with 4 high quality binders and few errors. There are particularly good descriptions of the use of the system. Clear instructions are provided for the installation of the system, requiring little knowledge of IBM PC microcomputers and PCDOS operating system software. The package provides the capability for in-house development of links with the IBM 4341 mainframe computers for downloading and uploading of data.

(E) Product Qualifications

The package is well tested and in production at a number of Canadian sites. Releases are made available to licensed users according to schedule and at regular intervals. The Company clearly has a well-defined and organized approach to product migration and enhancement.

(F) Vendor

The Vendor is a Canadian company with a strong background in Education Administration systems, starting with bureau time sharing services on mainframe computers. Contracts appear to be reasonable, although fairly rigid and the price is a little high.

4.2.3 System Performance, Strengths and Weaknesses - TSS (Columbia)

Key Performance Indicators

School Test Site	Parameter	IBM PC/XT	IBM PC/AT
Jasper Place CHS	Scheduler - Time		3:30 hours
	Scheduler - Performance		94%
	Scheduler - expected Perf.		94%
J. Percy Page CHS	Scheduler - Time	2:30-3:00 hours	
	Scheduler - Performance	100%	
	Timetables	5:00-6:00 hours	
	Master Schedule	0:30 hour	
	Class Lists/Atten. Reg.	5-7 min./class	
W. P. Wagner HS	Scheduler - Time	-	1:30 hours
	Scheduler - Performance	-	89%
	Timetables	-	11:00 hours
	Conflict Matrix	-	3:45 hours
	Course Tally	-	0:55 hours
	Master Schedule	-	1:00 hours
	Class Lists/Atten. Reg.	-	9:20 hours
	Marks Registers	-	9:20 hours
	Student Registers	-	1:00 hour
Victoria CHS	Scheduler - Time	-	2:10 hours
	Scheduler - Performance	-	98%
	Course Tally	-	0:35 hours
	Master Schedule	-	0:40 hours
	Class Lists/Atten. Reg.	-	2-3 min./class

Jasper Place CHS: 1846 students
J. Percy Page CHS: 463 students
W.P. Wagner HS: 975 students
Victoria CHS: 1598 students

(All times are in hours:minutes)

System Strengths:

- Meets its own specifications
- Well thought out data base
- State of the art software design
- Generally "clean running" system
- User definable data fields
- Surprisingly fast in all functions
- Very good and consistent data entry mechanisms
- Easy to install and learn
- Very well documented
- Flexible change/edit capability for student course requests re:

    - Mass changes (by sex, grade, program)
    - Semester preference
    - Teacher preference
    - Section preference
    - Individual and global alternates
    - Required course selection

- Fast, high integrity scheduler - remains "open"
- Excellent support, problem resolution - 1-800 hot-line
- Very good approach to enhancement, planned migration
- Open system design (facilitates future development)
- Automated data entry and multi-user facility
- Accomodates homeroom grouping
- Schedules any course in any combination or number of periods
- Accomodates any rotation tumble for any number of periods

System Weaknesses:

- Reporting limitations (format, range, common reports)
- Very limited instructor data
- Two screens required for attendance, registration
- Some important fields absent (e.g. EPSB I.D., middle name)
- No pre-requisite checking - can be honoured in scheduling process however
- Credits based on semester amount - need to use different course codes
- Student change transactions not captured
- Homeroom assignment by sequential allocation or random - not by course section

4.3 Evaluation of CEMAS

4.3.1 Testing Environment and Conditions

The evaluation approach was one of a simulation of a real life environment. The test data, used in the evaluation process, was the Jasper Place High School 1983-84 and 1984-85 real life data. The entire student body, course offerings, and student course selections formed the test data base. The data was input into the system via the data entry functions offered by CEMAS. In many instances, CEMAS offers alternative routes to get to the same point. Where it was feasible and/or important the alternate routes were explored to determine the optimum one for the future use of the system.

The hardware units used in the evaluation process represented, in our opinion, the minimum configurations that would be required for practical use.

All processes were simulated in their natural order of occurrence. The evaluation process took a considerably longer period of time than was originally anticipated due to circumstances beyond the control of the evaluation team.

The evaluation started on an IBM PC with a 35 Mb Tallgrass hard disk and a (General Electric 300 cps.) GENICOM printer. Since many processes in CEMAS run for 6 to 10 hours (close of scheduling runs 168 hrs) and make the system unavailable during this time, in order to speed up the evaluation a second unit (IBM PC XT with 10 Mb hard disk, and a 200 cps. OKIDATA printer) was added. A third unit was added later and installed in Steele Heights Junior High School in order to determine the applicability of CEMAS to the Junior High School environment.

4.3.2 Evaluation Results and Observations

The following tables show the outcome of the quantitative evaluation of CEMAS against the detailed criteria.

EVALUATION FACTOR	CRITERIA ITEMS	WEIGHT (W)	SCORE (S)	WEIGHTED SCORE (W X S)	MAX WT SCORE ($W \times S_{max}$)	WT SCORE/MAX WT SCORE
PRODUCT SCOPE & FUNCTION	**SCHOOL RECORDS**					
	Pre-Registration/Enrollment					
	Create student record	15	7	105		
	- school student I.D. - last name - middle name - first name - birthdate - current grade - sex - feeder school - home address					
	Registration confirmation notice	3	0	0		
	Feeder school confirmation notice	2	0	0		
	TOTAL Pre-Registration/Enrollment	20	7/30	105	200	.52
	Detailed Data Items					
	Student information	25	9	225		
	- school student I.D. - District student I.D. - Alberta Education student I.D. - last name - middle name - first name - birthdate - current grade - sex - feeder school - home address - telephone number					

EVALUATION FACTOR	CRITERIA ITEMS	WEIGHT (W)	SCORE (S)	WEIGHTED SCORE (W X S)	MAX WT SCORE (W X S_{max})	WT SCORE/MAX WT SCORE
	- emergency contact - name - telephone - entry information - entry date - registration code - withdrawal code - previous schools (2) - homeroom instruction - counsellor - parent/guardian information (up to 4) - name - address - telephone (home and business) - relationship - occupation - locker information - number - combination - student indebtedness - religious denomination - program type - number of credits earned - this school - other schools - academic history - travel information - method - distance - bus pass information - parking information - driver's licence - licence plate - parking space - medical information - disabilities/behaviours - medications - allergies					

EVALUATION FACTOR	CRITERIA ITEMS	WEIGHT (W)	SCORE (S)	WEIGHTED SCORE (W X S)	MAX WT SCORE (W X S_{max})	WT SCORE/MAX WT SCORE
	- date of last medical - physician information - health care number - departure information - date - reason - minimum of 6 user defined fields					
	Instructor Information	5	2	10		
	- instructor code - name - address - telephone - social insurance number - language of instruction - certificate number - courses taught - minimum of 6 user defined fields					
	Course information	15	1	15		
	- course code (5 character alpha-numeric) - description - pre-and co-requisites (minimum of 4) - must handle"and"/"or"situation - course type - language of instruction - course accreditation - credit value (2 digits) - pass/fail mark - grade					
	TOTAL Detailed Data Items	45	12/30	250	450	.55

EVALUATION FACTOR	CRITERIA ITEMS	WEIGHT (W)	SCORE (S)	WEIGHTED SCORE (W X S)	MAX WT SCORE (W X S_{max})	WT SCORE/MAX WT SCORE
	Reports/Inquiries	25	1	25		
	All reports and inquiries should be available for all or a specified range of records, in various sort orders. - class lists - homeroom lists - student name labels - student address labels - parent address labels - student I.D. cards - student data (alphabetical or numerical order) - parent data (alphabetical or numerical order) - instructor data (alphabetical or numerical order) - course data - student phone list - student name list - student grade list - feeder school list - locker information list - student population by instruction type - fee sheets The system should allow production of user-defined reports/inquiries using available data.					
	TOTAL Reports/Inquiries	25	1	25	250	.1
	TOTAL SCHOOL RECORDS	90	20/70	380	900	.42

EVALUATION FACTOR	CRITERIA ITEMS	WEIGHT (W)	SCORE (S)	WEIGHTED SCORE (W X S)	MAX WT SCORE (W X S_{max})	WT SCORE/MAX WT SCORE
	SCHEDULING					
	Detailed Data Items					
	- Course code - Course section					
	Manual scheduling (Arena Scheduling)	7	8	56		
	Pre-scheduling					
	Course Requests					
	manual entry	5	4	20		
	automated entry	9	0	0		
	- allow student to specify mandatory/ compulsory courses, - preferred courses, preferred alternatives, etc. - allow student to specify preferred section, semester, or instructor					
	Edit and validation of course requests	7	3	21		
	- checking of pre- and co-requisites in the current students' requests as well as history files - capability to override pre- and co-requisites - capability to complete pre-requisite checking for students from other District schools.					
	Pre-scheduling reports	9	2	18		
	- potential conflict matrix — for all or a specified range of courses. Additional selection criteria may be					

EVALUATION FACTOR	CRITERIA ITEMS	WEIGHT (W)	SCORE (S)	WEIGHTED SCORE (W X S)	MAX WT SCORE (W X S_{max})	WT SCORE/MAX WT SCORE
	based on the number of requests or the number of sections. - course tally - students with no requests - student course request list - min/max request list - min/max credit list - verification tickets - arena scheduling labels - students missing compulsory courses - students requesting specific course or group of courses					
	Master schedule builder					
	Capability to build a master schedule					
	manually	6	8	48		
	automatically	9	1	9		
	Capability of handling a variety of Scheduling units	9	0	0		
	- full year - semester - trimester - quartermester - 6 week unit - any combination of the above					
	User defined timetable rotation/tumble	10	0	0		
	Flexible number of periods per day	10	4	40		
	Capability to specify exclusive male or female sections	5	6	30		
	Capability to maintain current and future year/semester master schedules	8	1	8		

EVALUATION FACTOR	CRITERIA ITEMS	WEIGHT (W)	SCORE (S)	WEIGHTED SCORE (W X S)	MAX WT SCORE (W X S_{max})	WT SCORE/MAX WT SCORE
	Scheduling Process					
	User defined scheduling sequence - low grades first - high grades first - A to Z - Z to A	6	4	24		
	Unscheduling of no-shows/withdrawals	5	6	30		
	Scheduling of individual student or small groups of students	6	7	42		
	Capability to reset all students or partially scheduled students	8	5	40		
	Capability to lock scheduling assignments for all students or a group of students	8	7	56		
	Restart capability	8	1	8		
	Course weighting/semester balancing (ensure even course load for students)	8	4	32		
	Blocking of courses	7	0	0		
	Section balancing	8	0	0		
	Class balancing (males-females)	4	2	8		
	Capability to keep scheduling open after school start while starting to use the attendance module	9	0	0		
	Scheduling Reports/Inquiries	10	0	0		
	- student timetables — grid and list format - instructor timetables — grid and list format - room timetables — grid and list format - master schedule - student scheduling conflicts - students partially scheduled - unassigned time					

EVALUATION FACTOR	CRITERIA ITEMS	WEIGHT (W)	SCORE (S)	WEIGHTED SCORE (W X S)	MAX WT SCORE (W X S_{max})	WT SCORE/MAX WT SCORE
	Junior High Scheduling Requirements					
	Homeroom grouping for core subjects					
	Capability of scheduling any course in any combination and number of time periods					
	TOTAL SCHEDULING	181	73/240	490	1810	.2707
	STUDENT ATTENDANCE					
	Entry of Attendance Data					
	manual entry	5	6	30		
	automated entry	9	0	0		
	Multiple user-defined absence types	8	0	0		
	Capability to record attendance data at various intervals	10	6	60		
	- daily - twice per day - period by period - subject by subject					
	Attendance history	8	3	24		
	- at least ten days detail - cummulative totals					
	Attendance reports/inquiries	10	2	20		
	- student by class - student by subject - student by period					

EVALUATION FACTOR	CRITERIA ITEMS	WEIGHT (W)	SCORE (S)	WEIGHTED SCORE (W X S)	MAX WT SCORE (W X S_{max})	WT SCORE/MAX WT SCORE
	- homeroom attendance - daily summary - weekly summary - monthly summary - multiple absence - capability to produce unexcused absence report for the current day within 30 minutes - the system should allow user defined reports/inquiries using available data					
	TOTAL ATTENDANCE	50	17/60	134	500	.268
	STUDENT MARKS					
	Entry of marks data					
	manual	5	4	20		
	automated	9	0	0		
	Marks data	10	8	80		
	- minimum of 4 term marks plus final mark - letter or percentage grades					
	Student Exams	6	3	18		
	Exam timetable builder					
	- automated - manual					
	Exam Reports/Inquiries					
	- potential exam conflict matrix - exam schedules					

EVALUATION FACTOR	CRITERIA ITEMS	WEIGHT (W)	SCORE (S)	WEIGHTED SCORE (W X S)	MAX WT SCORE (W X S_{max})	WT SCORE/MAX WT SCORE
	Reports/Inquiries	10	0	0		
	proof list report cards - marks data - final mark, calculated according to user-defined formula attenandance data - class averages - honour lists - potential failure lists - graduation list					
	TOTAL STUDENT MARKS	40	15/50	118	400	.29
	UTILITY FUNCTIONS					
	Backup/Restore	12	4	48		
	Security/Controls	8	6	48		
	TOTAL UTILITY FUNCTIONS	20	10/20	96	200	.4
	GRAND TOTAL, PRODUCT SCOPE AND FUNCTION	381	135/440	1218	3810	.3197
EASE OF USE	- flexibility - modular, table driven - help facilities - menu driven	60	3	180		
	GRAND TOTAL, EASE OF USE	60	3	180	600	.3

EVALUATION FACTOR	CRITERIA ITEMS	WEIGHT (W)	SCORE (S)	WEIGHTED SCORE (W X S)	MAX WT SCORE (W X S_{max})	WT SCORE/MAX WT SCORE
TECHNICAL CONSIDERATIONS	- hardware - system software environment - operating system - utilities - database management/system internals/files - networking cabpabilities - user hooks - modularity of the system	80	2	160		
	GRAND TOTAL, TECHNICAL CONSIDERATIONS	80	2	160	800	.2
SUPPORT & SERVICES	- local versus where/how far - package support and services - software support, custom modifications - documentation - user guide, application system, procedural, operations guide, file layouts - training - applications system, operational (DP), availability schedule, format, location, prerequisites - implementation - training - initialization (conversion,file set-up, output forms) - implementation plan	70	0	0		
	GRAND TOTAL, SUPPORT & SERVICES	70	0	0	700	0

EVALUATION FACTOR	CRITERIA ITEMS	WEIGHT (W)	SCORE (S)	WEIGHTED SCORE (W X S)	MAX WT SCORE (W X S_{max})	WT SCORE/MAX WT SCORE
PRODUCT QUALIFICATIONS		80	0	0		
	- package background - reliability - current development status - number of installations - product development plans - release concept, portability, verticality					
	GRAND TOTAL, PRODUCT QUALIFICATIONS	80	0	0	800	0
VENDOR		70	1	70		
	- Corporate information - background and history - financial performance - employee base - Market volatility and vendor stability - References - Contractual Terms - maintenance - warranty - ownership rights - discount structure/price limit					
	GRAND TOTAL, VENDOR	70	1	70	700	.1

Observations

The following comments are offered in support of the quantitative evaluation of CEMAS.

(A) Product Scope and Function

Pre-Registration: The facility is good but there is no method of producing the appropriate reports. There is an excellent range of student demographic data but no user defined fields. Particularly important fields missing include: middle name, 15 character EPSB I.D.

Detailed Data Items: Most important fields are present; again, the lack of user-defined fields causes problems.

Instructor Information: The instructor information is good but is restricted to numeric teacher codes and again no user-defined fields.

Course Information: The data in this area is inadequate, for example:

- Credit range is 0.000 to 9.999 which is insufficient for large courses which can have up to 30 or more credits.
- It does not allow co-requisites.
- Only 2 pre-requisites per course are allowed.

Reports/Inquiries: There were numerous problems with reports:

- They do not always work for a range of values.
- They are very slow in most cases.
- Grid timetables do not recognize school timetable "tumbles".

Many reports do not exist in the system and there is no mechanism available for their derivation; for example there is no Report Writer program.

Pre-Scheduling:

The manual entry of course requests is slow and there is no facility for the automated entry of course requests. In addition, it is impossible to create academic history to test the ability to check pre-requisites from previous history; the package cannot check pre- and co-requisites of courses in the given year, i.e. it cannot force Chemistry 10 to be scheduled before Chemistry 20 if both are requested.

A potential conflict matrix can be produced but only for all courses; one cannot specify a range of courses.

Master Scheduler Builder:

An automatic schedule builder is provided but it does not work. The system, in this function area, can only handle full year and semestered courses, not quarter-mesters or tri-mesters. A mechanism exists for providing very simple timetable rotations but even this is not reflected in the student grid timetables, marks or attendance lists.

A mechanism also exists for maintaining current and future year master schedules but this does not work correctly.

Scheduling Process:

The scheduling sequence cannot be directly specified, this can be achieved indirectly with "patching" tricks. The process itself is slow and cannot be restarted if aborted. Multiple passes are needed. The process does not work correctly; in some cases it puts students in two classes at the same time and ignores some sections of courses resulting in unbalanced classes.

Course blocking facilities are provided but do not work properly. Also, one cannot keep attendance until scheduling has been closed. Scheduling "close" ties up the system for an unacceptably long period of time (1 week at Jasper Place High School).

Scheduling Reports/Inquiries:

Scheduling reports are very slow and many do not work. There are no user definable reports.

Attendance:

As described above, attendance cannot be kept until scheduling is fully closed. There is no mechanism for automated attendance data entry and manual data entry is slow. In addition, there are no user definable attendance type codes.

It was impossible to test the attendance history function thoroughly since the attendance "aging" function does not work properly.

Attendance reports are very slow and some options do not work. There are no user-definable reports.

Student Marks:

There is no function for automatically entering marks data; manual entry is slow. An exam timetable builder is provided but does not work.

The report cards function does not work due to the absence of format specifications.

Utility Functions:

Backup and Restore functions are not provided; the standard utilities provided under PC DOS are adequate for programmer use.

The security system is adequate although it does not appear to function as stated in the documentation.

The need to re-start the application package after using utility functions is annoying and would be particularly difficult for a non technical user.

(B) Ease of Use:

CEMAS is not a flexible system - it can only handle certain types of timetable rotations and it only allows 2 semesters. Although menu-driven, the function keys and cursor controls are not consistent from screen to screen.

The online help facility simply lists sections of the operating manual and error messages are often cryptic or inappropriate with no explanations in the documentation. Screen response is generally slow.

The overall ease of use is negatively impacted by poor system performance and poor functionality, and the need to avoid functions that do not work.

(C) Technical Considerations:

The system runs on an IBM PC/XT under PC DOS 2.00 or higher operating system version. CEMAS was tested in a single user environment only. It is unable to extract data from external files as no information was given on file layout or content.

Overall, the CEMAS package is a closed system with a non-modular design. This causes difficulties for the vendor in making modifications; it is impossible for the user to do this.

(D) Support and Services:

The company is based in Toronto and is fairly small, leaving doubts as to their ability to make custom modifications. Telephone support is poor.
For example:

- Calls were not returned
- We were frequently able to reach only the answering service
- There was a tendency to blame problems on user error rather than to admit the possibility of problems with the software
- The company was sometimes reluctant to talk to the Analyst/Programmer who called, they preferred to talk to the Project Leader only.

The design of the system does not lend itself to user modification and there is no ability to set up system data except by keypunch.

The documentation is poor in appearance and substance. For example:

- There are many typographical errors
- There is no index
- There are no instructions given for installation of the system
- Descriptions of functions and their use are incomplete and poorly explained
- On-line help consisted of displaying the appropriate section of the printed documentation
- There was no explanation of error messages

(E) Product Qualifications:

During the course of the CEMAS investigation, many problems were encountered with both the product and with vendor support, which extended the evaluation process considerably. As a consequence, one very important conclusion which was drawn by the team is that CEMAS was a product which was still under active development. The frequency and nature of product updates has clearly supported this conclusion. Updates received during the course of the evaluation would be best described as fixes rather than product enhancements. Product updates were occasionally found to corrupt things which had previously worked. Up to and including the final days of practical testing of the product, it is the opinion of the evaluation team that CEMAS was not a mature or stable product.

We are unable to say how many production sites are currently using CEMAS.

F) Vendor

The vendor, which is also the developer - COMPUTERLIB, is based in Toronto. To date there is no known local support for CEMAS. Systems documentation is poor but was improving. The Distributed Systems Team was in frequent and close communication with the developers throughout the evaluation of CEMAS. The frequent problems which were encountered were communicated to Computerlib with expedience. Response to problem reporting was mixed at best, and problem resolution was less than acceptable. Lack of effective, local support for CEMAS should be considered a significant inhibitory factor to potential users and this factor becomes even more critical where District level support is unavailable.

4.3.3 System Performance, Strengths and Weaknesses - CEMAS (Computerlib)

Key Performance Indicators

School Test Site	Parameter	IBM PC/XT
Jasper Place	Timetables	doesn't work
	Conflict Matrix	6:00 hours
	Course Tally	3:00 hours
	Master Schedule Print	2:00 hours
	Class Lists	1-3 min/class
	Attendance	1-3 min/class
	Marks Registers	1-3 min/class
	Student Registers	1-3 min/class
	Course Requests	27.0 hours
	Scheduler - Time	19:30 hours
	Scheduler - Performance*	84%
	Scheduler - Expected Performance	85%

Jasper Place CHS: 1846 students

(All times are in hours: minutes)

* N.B. Subsequent runs corrupted previously achieved results

System Strengths:

- Comprehensive database with good data elements
- Easy to use screens
- Well integrated system; modules all fit together

System Weaknesses:

- System still under conversion and/or development
- Unavailability/non-existence of system documentation
- System does not use Middle Name - link to mainframe not possible
- The scheduler may be limited to 8 periods per day
- Course credit format is N.NN; should be NN
- Unable to generate ad-hoc reports
- Benchmark tests (particularly scheduling) not completed
- Some functions not working (e.g. student request list)
- Report production time long - cannot be effectively suspended
- Many system functions are very slow
- Master schedule builder does not accomodate semester/non-semester mix
- Course translation not available
- Doesn't handle quarter-semester courses
- "Fatal" errors occur without warning
- Unstable paging condition during report production
- Instructor code presently numeric - needs at least to be alphanumeric
- References on installed IBM systems not available
- Hard coding of year into system
- Must enter area code with every telephone number

5.0 COMPARATIVE EVALUATION OF SIMS: SENIOR HIGH SCHOOL PERSPECTIVE

5.1 Comparison Summary and Review of SIMS Evaluation Data

The following tables show the quantitative evaluation data for the three microcomputer based information management systems which were evaluated. Two mini-computer products were also tested in the same environment and will be the subject of another report. The data is displayed on the Detailed Scoring Comparison Form which was referred to previously. This form parallels the Detailed Evaluation Criteria Forms. The Comparison Summary and Review forms differs from the Detailed Criteria Forms in that all (non-scorable) context related criteria are omitted and only the weighting factor, raw and weighted scores from the evaluation are displayed. Various levels of totals are shown on the form the major purpose of which is to facilitate the quick and objective comparison of system performance.

Detailed Scoring Comparison - Senior High School Perspective

EVALUATION FACTOR	CRITERIA ITEMS	WEIGHT	TSS		SIRS		CEMAS	
		(W)	SCORE (S)	WEIGHTED SCORE (W X S)	SCORE (S)	WEIGHTED SCORE (W X S)	SCORE (S)	WEIGHTED SCORE (W X S)
PRODUCT SCOPE & FUNCTION	**SCHOOL RECORDS**							
	Pre-Registration/Enrollment							
	Create student record	15	6	90	8	120	7	105
	Registration confirmation notice	3	5	15	2	6	0	0
	Feeder school confirmation notice	2	2	4	0	0	0	0
	TOTAL Pre-Registration/Enrollment	**20**	**13/30**	**109**	**10/30**	**126**	**7/30**	**105**
	Detailed Data Items							
	Student information	25	8	200	8	200	9	225
	Instructor Information	5	3	15	7	35	2	10
	Course information	15	8	120	8	120	1	15
	TOTAL Detailed Data Items	**45**	**19/30**	**335**	**23/30**	**355**	**12/30**	**250**
	Reports/Inquiries	25	6	150	6	150	1	25
	TOTAL Reports/Inquiries	**25**	**6/10**	**150**	**6/10**	**150**	**1/10**	**25**
	TOTAL SCHOOL RECORDS	**90**	**38/70**	**594**	**39/70**	**631**	**20/70**	**380**
	SCHEDULING							
	Manual scheduling (Arena Scheduling)	7	9	63	9	63	8	56

EVALUATION FACTOR	CRITERIA ITEMS	WEIGHT (W)	TSS		SIRS		CEMAS	
			SCORE (S)	WEIGHTED SCORE (W X S)	SCORE (S)	WEIGHTED SCORE (W X S)	SCORE (S)	WEIGHTED SCORE (W X S)
	Pre-scheduling							
	Course Requests							
	manual entry	5	9	45	7	35	4	20
	automated entry	9	9	81	4	36	0	0
	Edit and validation of course requests	7	6	42	9	63	3	21
	Pre-scheduling reports	9	8	72	9	81	2	18
	TOTAL Pre-scheduling	**30**	**32/40**	**240**	**29/40**	**215**	**9/40**	**59**
	Master Schedule Builder							
	Capability to build a master scheduler							
	manually	6	8	48	7	42	8	48
	automatically	9	0	0	0	0	1	9
	Capability of handling a variety of scheduling units	9	6	54	8	72	0	0
	User defined timetable rotation/tumble	10	10	100	8	80	0	0
	Flexible number of periods per day	10	10	100	8	80	4	40
	Capability to specify exclusive male or female sections	5	4	20	8	40	6	30
	Capability to maintain current and future year/semester master schedules	8	3	24	10	80	1	8
	TOTAL Master Schedule Builder	**57**	**41/70**	**346**	**49/70**	**394**	**20/70**	**135**
	Scheduling Process							
	User defined scheduling sequence	6	5	30	7	42	4	24
	Unscheduling of no-shows/withdrawals	5	9	45	9	45	6	30

EVALUATION FACTOR	CRITERIA ITEMS	WEIGHT (W)	TSS SCORE (S)	TSS WEIGHTED SCORE (W X S)	SIRS SCORE (S)	SIRS WEIGHTED SCORE (W X S)	CEMAS SCORE (S)	CEMAS WEIGHTED SCORE (W X S)
	Scheduling of individual student or small groups of students	6	8	48	0	0	7	42
	Capability to reset all students or partially scheduled students	8	10	80	0	0	5	40
	Capability to lock scheduling assignments for all students or a group of students	8	5	40	0	0	7	56
	Restart capability	8	0	0	0	0	1	8
	Course weighting/semester balancing (ensure even course load for students)	8	7	56	7	56	4	32
	Blocking of courses	7	9	63	8	56	0	0
	Section balancing	8	8	64	9	72	0	0
	Class balancing (males-females)	4	7	28	8	32	2	8
	Capability to keep scheduling open after school start while starting to use the attendance module	9	9	81	0	0	0	0
	TOTAL Scheduling Process	77	77/110	535	48/110	303	36/110	240
	Scheduling Reports/Inquiries	10	7	70	9	90	0	0
	Junior High Scheduling Requirements							
	Homeroom grouping for core subjects							
	Capability of scheduling any course in any combination and number of time periods							
	TOTAL SCHEDULING	181	166/240	1254	144/240	1065	73/240	490
	STUDENT ATTENDANCE							
	Entry of Attendance Data							
	manual entry	5	7	35	9	45	6	30
	automated entry	9	8	72	0	0	0	0

EVALUATION FACTOR	CRITERIA ITEMS	WEIGHT (W)	TSS		SIRS		CEMAS	
			SCORE (S)	WEIGHTED SCORE (W X S)	SCORE (S)	WEIGHTED SCORE (W X S)	SCORE (S)	WEIGHTED SCORE (W X S)
	Multiple user-defined absence types	8	9	72	8	64	0	0
	Capability to record attendance data at various intervals	10	9	90	9	90	6	60
	Attendance history	8	9	72	7	56	3	24
	Attendance reports/inquiries	10	6	60	7	70	2	20
	TOTAL ATTENDANCE	50	48/60	401	40/60	325	17/60	134
	STUDENT MARKS							
	Entry of marks data							
	manual	5	8	40	8	40	4	20
	automated	9	8	72	0	0	0	0
	Marks data	10	8	80	8	80	8	80
	Student Exams	6	0	0	0	0	3	18
	Exam timetable builder Exam Reports/Inquiries							
	Reports/Inquiries	10	6	60	8	80	0	0
	TOTAL STUDENT MARKS	40	30/50	252	24/50	200	15/50	118

EVALUATION FACTOR	CRITERIA ITEMS	WEIGHT	TSS		SIRS		CEMAS	
		(W)	SCORE (S)	WEIGHTED SCORE (W X S)	SCORE (S)	WEIGHTED SCORE (W X S)	SCORE (S)	WEIGHTED SCORE (W X S)
	UTILITY FUNCTIONS							
	Backup/Restore	12	8	96	8	96	4	48
	Security/Controls	8	0	0	2	16	6	48
	TOTAL UTILITY FUNCTIONS	20	8/20	96	10/20	112	10/20	96
	GRAND TOTAL, PRODUCT SCOPE AND FUNCTION	381	290/440	2597	257/440	2333	135/440	1218
EASE OF USE		60	8	480	6	360	3	180
	GRAND TOTAL, EASE OF USE	60	8/10	480	6/10	360	3/10	180
TECHNICAL CONSIDERATION		80	9	720	6	480	2	160
	GRAND TOTAL, TECHNICAL CONSIDERATIONS	80	9/10	720	6/10	480	2/10	160
SUPPORT & SERVICES		70	8	560	7	490	0	0
	GRAND TOTAL, SUPPORT & SERVICES	70	8/10	560	7/10	490	0/10	0

EVALUATION FACTOR	CRITERIA ITEMS	WEIGHT	TSS		SIRS		CEMAS	
		(W)	SCORE (S)	WEIGHTED SCORE (W X S)	SCORE (S)	WEIGHTED SCORE (W X S)	SCORE (S)	WEIGHTED SCORE (W X S)
PRODUCT QUALIFICATIONS		80	9	720	6	480	0	0
	GRAND TOTAL, PRODUCT QUALIFICATIONS	80	9/10	720	6/10	480	0/10	0
VENDOR		70	8	560	7	490	1	70
	GRAND TOTAL, VENDOR	70	8/10	560	7/10	490	1/10	70

5.2 Relative Suitability of SIMS to the Senior High Schools

The foregoing results, can now be used to determine the relative suitability of a particular product to a particular user's needs.

The following describes a method of determining this suitability relative to the six major evaluation factors.

Before determining the overall suitability of a system to the needs of the user, however, the user must first define the relative emphasis that he wishes to place on the major evaluation factors.

The following table shows the emphasis which the evaluation team believes is an appropriate emphasis to place on the major evaluation factors. The emphases are expressed as percentages and total to 100. While it can be clearly seen that product scope and function is the single most important evaluation factor, this importance is outweighed by the collective emphasis on the other five factors.

EVALUATION FACTOR	EMPHASIS (%)
PRODUCT SCOPE AND FUNCTION	45
EASE OF USE (OF PRODUCT)	10
TECHNICAL CONSIDERATIONS	10
SUPPORT AND SERVICES	15
PRODUCT QUALIFICATIONS	10
VENDOR	10

Relative suitability can be defined as a function of weighted score and relative emphasis in the following way.

$$\textbf{Relative Suitability} = \textbf{(\% Emphasis)} \times \frac{\textbf{(weighted score)}}{\textbf{(max. possible weighted score)}}$$

The ratios of weighted score to maximum possible weighted score for the products evaluated are shown on the Detailed Evaluation Criteria Forms (sections 4.1.2, 4.2.2, and 4.3.2).

Applying the above formula to the evaluation data at hand gives the following result.

EVALUATION FACTOR	EMPHASIS (%)	RELATIVE PRODUCT SUITABILITY		
		TSS	**SIRS**	**CEMAS**
PRODUCT SCOPE AND FUNCTION	45	30	27	14
EASE OF USE	10	8	6	3
TECHNICAL CONSIDERATIONS	10	9	6	2
SUPPORT AND SERVICES	15	12	10	0
PRODUCT QUALIFICATIONS	10	9	6	0
VENDOR	10	8	7	1
TOTALS	**100**	**76**	**62**	**20**

By using this process, entries in the columns identified by product names will be numbers less than or equal to the percent emphasis number. These numbers can be considered as scores out of the assigned percent emphasis numbers. Vertical totals of suitability for each product will be numbers less than or equal to 100 which can easily be compared across products.

The above table shows, for example, that CEMAS is considered to be very unsuitable to the needs as defined in the support and services area while, by contrast, Columbia's The School System scored 12 of a maximum possible 15 points for the same evaluation factor.

The suitabilities calculated according to the method described should be viewed as relative measures of the extent to which a product meets a particular user's needs. This suitability will vary according to the completeness of the criteria, user defined weighting factors, percent emphasis and, very obviously, on the scores assigned by the product evaluator. Within this context, therefore, it is very important to note that the evaluation process which has been developed and applied in this way is extremely flexible allowing the user complete discretion to decide which criteria will be used, the weighting factors and the relative emphasis. In short, all that a user of this process needs to depend on is the actual raw scores which were assigned as a result of the hands-on testing work.

To illustrate the flexibility of the process, two more examples of product suitability have been determined and are shown below. The reader will see that the percent emphasis distribution has been changed (while still totalling 100) in each case. In these examples, the individual criteria weighting factors were not changed (though they could have been) and thus the same ratios of weighted score to maximum weighted scores were applied.

SIMULATION 1 SENIOR HIGH SCHOOL PERSPECTIVE

EVALUATION FACTOR	EMPHASIS (%)	RELATIVE PRODUCT SUITABILITY		
		TSS	SIRS	CEMAS
PRODUCT SCOPE AND FUNCTION	55	37	33	17
EASE OF USE	20	16	12	6
TECHNICAL CONSIDERATIONS	5	4	3	1
SUPPORT AND SERVICES	10	8	7	0
PRODUCT QUALIFICATIONS	5	4	3	0
VENDOR	5	4	3	0
TOTALS	**100**	**73**	**61**	**24**

SIMULATION 2 SENIOR HIGH SCHOOL PERSPECTIVE

EVALUATION FACTOR	EMPHASIS (%)	RELATIVE PRODUCT SUITABILITY		
		TSS	SIRS	CEMAS
PRODUCT SCOPE AND FUNCTION	50	34	30	15
EASE OF USE	20	16	12	6
TECHNICAL CONSIDERATIONS	10	9	6	2
SUPPORT AND SERVICES	-	-	-	-
PRODUCT QUALIFICATIONS	20	18	12	0
VENDOR	-	-	-	-
TOTALS	100	77	60	23

As previously stated, the approach used to define relative suitability is very flexible and may be employed to meet the needs of a particular user. Appendix 6 shows a further simulation (use of the same evaluation data) in which not all of the evaluation criteria were used and in which the actual criteria weighting factors were changed to reflect a particular user perspective.

6.0 PRODUCT EVALUATIONS - JUNIOR HIGH SCHOOL PERSPECTIVE

Two of the three microcomputer - based systems - SIRS and The School System were tested in a Junior High School in addition to the above tests in Senior High Schools.

The Detailed Evaluation Criteria Forms show two specific requirements in relation to the scheduling function which were considered to be of special relevance to junior high school environments, notably:

- Homeroom grouping for core subjects
- Capability of scheduling any course in any combination and number of time periods

It was obviously impossible to retest these features and other junior high specific features (such as morning/afternoon attendance) with an existing senior high school database. For this reason the two above systems were tested independently in a junior high school.

6.1 Evaluation of SIRS

The MIG SIRS package was evaluated at Steele Heights Junior High School to determine its suitability in a junior high setting. Prior to starting the evaluation a discussion with MIG indicated that upgrades to the software would be needed in the "core subject" grouping area. These upgrades were made about half-way through the evaluation but did not significantly improve the overall result.

The evaluation spanned a period of one and a half months during which time a number of scheduling simulations were made with improved results on each occasion. Current schedules and student demographic data were used with an expectation of achieving at least 95% fully scheduled student course requests.

6.1.1 Testing Environment and Conditions

Steele Heights Junior High school has 646 students enrolled in grades 7, 8 and 9. It uses a strict 4 day, 6 period rotation schedule and operates attendance at the half-day reporting period level. The classes and subjects offered are very typical of other district junior high schools with a small number of ESL and vocational courses and a high correspondence to the Alberta Education course listings. Steele Heights uses homerooms of approximately 25 students each and has, in common with most other Junior High schools in the District, a large number of "core" periods for each student, that is, mandatory courses. Grade 7 and 8 students must take Physical Education, Computer Studies, Language Arts, Mathematics, Science and Social Studies. Grade 9 students do not have to take Computer Studies, but the other five courses apply.

The SIRS system was copied onto an IBM XT computer. The computer has a 10 Megabyte disc drive, a 360 kilobyte flexible disc drive (used mainly for loading data to and from other sources and backing up the SIRS database) an amber high-resolution monitor, 512 kilobytes of RAM (Random Access Memory) and an OKIDATA Microline 84 printer operating at about 160 characters per second. The system supports a single user with no option to upgrade to multiple users.

Data entry was entirely by keyboard for this test, although the senior high school test employed data loading from mainframe files (which were initially converted to text format).

The testing timescale was one and a half months which allowed time for the setting up of all demographic data, master schedule, course requests and school data (such as rooms, teachers, programs etc.). It also allowed time for 2 scheduling simulations for all students, a number of smaller simulation tests and limited testing of the marks and attendance software.

6.1.2 Evaluation Results and Observations

The following tables show the outcome of the quantitative evaluation of SIRS against the Detailed Evaluation Criteria.

EVALUATION FACTOR	CRITERIA ITEMS	WEIGHT (W)	SCORE (S)	WEIGHTED SCORE (W X S)	MAX WT SCORE (W X S_{max})	WT SCORE/MAX WT SCORE
PRODUCT SCOPE & FUNCTION	**SCHOOL RECORDS**					
	Pre-Registration/Enrollment					
	Create student record	15	8	120		
	- school student I.D. - last name - middle name - first name - birthdate - current grade - sex - feeder school - home address					
	Registration confirmation notice	3	0	0		
	Feeder school confirmation notice	2	0	0		
	TOTAL Pre-Registration/Enrollment	20	8/30	120	200	.6
	Detailed Data Items					
	Student information	25	4	100		
	- school student I.D. - District student I.D. - Alberta Education student I.D. - last name - middle name - first name - birthdate - current grade - sex - feeder school - home address - telephone number					

EVALUATION FACTOR	CRITERIA ITEMS	WEIGHT (W)	SCORE (S)	WEIGHTED SCORE (W X S)	MAX WT SCORE (W X S_{max})	WT SCORE/MAX WT SCORE
	- emergency contact					
	- name					
	- telephone					
	- entry information					
	- entry date					
	- registration code					
	- withdrawal code					
	- previous schools (2)					
	- homeroom instruction					
	- counsellor					
	- parent/guardian information (up to 4)					
	- name					
	- address					
	- telephone (home and business)					
	- relationship					
	- occupation					
	- locker information					
	- number					
	- combination					
	- student indebtedness					
	- religious denomination					
	- program type					
	- number of credits earned					
	- this school					
	- other schools					
	- academic history					
	- travel information					
	- method					
	- distance					
	- bus pass information					
	- parking information					
	- driver's licence					
	- licence plate					
	- parking space					
	- medical information					
	- disabilities/behaviours					
	- medications					
	- allergies					

EVALUATION FACTOR	CRITERIA ITEMS	WEIGHT (W)	SCORE (S)	WEIGHTED SCORE (W X S)	MAX WT SCORE (W X S_{max})	WT SCORE/MAX WT SCORE
	- date of last medical - physician information - health care number					
	- departure information - date - reason					
	- minimum of 6 user defined fields					
	Instructor Information	5	5	25		
	- instructor code - name - address - telephone - social insurance number - language of instruction - certificate number - courses taught - minimum of 6 user defined fields					
	Course information	15	2	30		
	- course code (5 character alpha-numeric) - description - pre-and co-requisites (minimum of 4) - must handle"and"/"or"situation - course type - language of instruction - course accreditation - credit value (2 digits) - pass/fail mark - grade					
	TOTAL Detailed Data Items	45	11/30	155	450	.33

EVALUATION FACTOR	CRITERIA ITEMS	WEIGHT (W)	SCORE (S)	WEIGHTED SCORE (W X S)	MAX WT SCORE (W X S_{max})	WT SCORE/MAX WT SCORE
	Reports/Inquiries	25	2	50		
	All reports and inquiries should be available for all or a specified range of records, in various sort orders.					
	- class lists - homeroom lists - student name labels - student address labels - parent address labels - student I.D. cards - student data (alphabetical or numerical order) - parent data (alphabetical or numerical order) - instructor data (alphabetical or numerical order) - course data - student phone list - student name list - student grade list - feeder school list - locker information list - student population by instruction type - fee sheets					
	The system should allow production of user-defined reports/inquiries using available data.					
	TOTAL Reports/Inquiries	25	2	50	250	.2
	TOTAL SCHOOL RECORDS	90	21/70	325	900	.36

EVALUATION FACTOR	CRITERIA ITEMS	WEIGHT (W)	SCORE (S)	WEIGHTED SCORE (W X S)	MAX WT SCORE (W X S_{max})	WT SCORE/MAX WT SCORE
	SCHEDULING					
	Detailed Data Items					
	- Course code - Course section					
	Manual scheduling (Arena Scheduling)	7	6	42		
	Pre-scheduling					
	Course Requests					
	manual entry	5	2	10		
	automated entry	9	0	0		
	- allow student to specify mandatory/ compulsory courses, - preferred courses, preferred alternatives, etc. - allow student to specify preferred section, semester, or instructor					
	Edit and validation of course requests	7	4	28		
	- checking of pre- and co-requisites in the current students' requests as well as history files - capability to override pre- and co-requisites - capability to complete pre-requisite checking for students from other District schools.					
	Pre-scheduling reports	9	4	36		
	- potential conflict matrix — for all or a specified range of courses. Additional selection criteria may be					

EVALUATION FACTOR	CRITERIA ITEMS	WEIGHT (W)	SCORE (S)	WEIGHTED SCORE (W X S)	MAX WT SCORE (W X S_{max})	WT SCORE/MAX WT SCORE
	based on the number of requests or the number of sections.					
	- course tally - students with no requests - student course request list - min/max request list - min/max credit list - verification tickets - arena scheduling labels - students missing compulsory courses - students requesting specific course or group of courses					
	Master schedule builder					
	Capability to build a master schedule					
	manually	6	8	48		
	automatically	9	0	0		
	Capability of handling a variety of Scheduling units	9	4	36		
	- full year - semester - trimester - quartermester - 6 week unit - any combination of the above					
	User defined timetable rotation/tumble	10	4	40		
	Flexible number of periods per day	10	6	60		
	Capability to specify exclusive male or female sections	5	7	35		
	Capability to maintain current and future year/semester master schedules	8	5	40		

EVALUATION FACTOR	CRITERIA ITEMS	WEIGHT (W)	SCORE (S)	WEIGHTED SCORE (W X S)	MAX WT SCORE (W X S_{max})	WT SCORE/MAX WT SCORE
	Scheduling Process					
	User defined scheduling sequence - low grades first - high grades first - A to Z - Z to A	6	4	24		
	Unscheduling of no-shows/withdrawals	5	5	25		
	Scheduling of individual student or small groups of students	6	0	0		
	Capability to reset all students or partially scheduled students	8	5	40		
	Capability to lock scheduling assignments for all students or a group of students	8	10	80		
	Restart capability	8	8	64		
	Course weighting/semester balancing (ensure even course load for students)	8	5	40		
	Blocking of courses	7	8	56		
	Section balancing	8	8	64		
	Class balancing (males-females)	4	4	16		
	Capability to keep scheduling open after school start while starting to use the attendance module	9	0	0		
	Scheduling Reports/Inquiries	10	3	30		
	- student timetables — grid and list format - instructor timetables — grid and list format - room timetables — grid and list format - master schedule - student scheduling conflicts - students partially scheduled - unassigned time					

EVALUATION FACTOR	CRITERIA ITEMS	WEIGHT (W)	SCORE (S)	WEIGHTED SCORE (W X S)	MAX WT SCORE (W X S_{max})	WT SCORE/MAX WT SCORE
	Junior High Scheduling Requirements					
	Homeroom grouping for core subjects	9	4	36		
	Capability of scheduling any course in any combination and number of time periods	10	4	40		
	TOTAL SCHEDULING	200	118/260	890	2000	.45
	STUDENT ATTENDANCE					
	Entry of Attendance Data					
	manual entry	5	5	25		
	automated entry	9	0	0		
	Multiple user-defined absence types	8	6	48		
	Capability to record attendance data at various intervals	10	6	60		
	- daily - twice per day - period by period - subject by subject					
	Attendance history	8	5	40		
	- at least ten days detail - cummulative totals					
	Attendance reports/inquiries	10	3	30		
	- student by class - student by subject - student by period					

EVALUATION FACTOR	CRITERIA ITEMS	WEIGHT (W)	SCORE (S)	WEIGHTED SCORE (W X S)	MAX WT SCORE ($W \times S_{max}$)	WT SCORE/MAX WT SCORE
	- homeroom attendance - daily summary - weekly summary - monthly summary - multiple absence - capability to produce unexcused absence report for the current day within 30 minutes - the system should allow user defined reports/inquiries using available data					
	TOTAL ATTENDANCE	50	25/60	203	500	.4
	STUDENT MARKS					
	Entry of marks data					
	manual	5	7	35		
	automated	9	0	0		
	Marks data	10	6	60		
	- minimum of 4 term marks plus final mark - letter or percentage grades					
	Student Exams	6	4	24		
	Exam timetable builder					
	- automated - manual					
	Exam Reports/Inquiries					
	- potential exam conflict matrix - exam schedules					

(100)

EVALUATION FACTOR	CRITERIA ITEMS	WEIGHT (W)	SCORE (S)	WEIGHTED SCORE (W X S)	MAX WT SCORE (W X S_{max})	WT SCORE/MAX WT SCORE
	Reports/Inquiries	10	5	50		
	proof list report cards - marks data - final mark, calculated according to user-defined formula attenandance data - class averages - honour lists - potential failure lists - graduation list					
	TOTAL STUDENT MARKS	40	22/50	169	400	.42
	UTILITY FUNCTIONS					
	Backup/Restore	12	6	72		
	Security/Controls	8	0	0		
	TOTAL UTILITY FUNCTIONS	20	6/20	72	200	.36
	GRAND TOTAL, PRODUCT SCOPE AND FUNCTION	400	192/460	1659	4000	.41
EASE OF USE	- flexibility - modular, table driven - help facilities - menu driven	60	5	300		
	GRAND TOTAL, EASE OF USE	60	5	300	600	.5

EVALUATION FACTOR	CRITERIA ITEMS	WEIGHT (W)	SCORE (S)	WEIGHTED SCORE (W X S)	MAX WT SCORE (W X S_{max})	WT SCORE/MAX WT SCORE
TECHNICAL CONSIDERATIONS	- hardware - system software environment - operating system - utilities - database management/system internals/files - networking capabilities - user hooks - modularity of the system	80	3	240		
	GRAND TOTAL, TECHNICAL CONSIDERATIONS	80	3	240	800	.3
SUPPORT & SERVICES	- local versus where/how far - package support and services - software support, custom modifications - documentation - user guide, application system, procedural, operations guide, file layouts - training - applications system, operational (DP), availability schedule, format, location, prerequisites - implementation - training - initialization (conversion, file set-up, output forms) - implementation plan	70	2	140		
	GRAND TOTAL, SUPPORT & SERVICES	70	2	140	700	.2

EVALUATION FACTOR	CRITERIA ITEMS	WEIGHT (W)	SCORE (S)	WEIGHTED SCORE (W X S)	MAX WT SCORE (W X S_{max})	WT SCORE/MAX WT SCORE
PRODUCT QUALIFICATIONS		80	4	320		
	- package background - reliability - current development status - number of installations - product development plans - release concept, portability, verticality					
	GRAND TOTAL, PRODUCT QUALIFICATIONS	80	4	320	800	.4
VENDOR		70	4	280		
	- Corporate information - background and history - financial performance - employee base - Market volatility and vendor stability - References - Contractual Terms - maintenance - warranty - ownership rights - discount structure/price limit					
	GRAND TOTAL, VENDOR	70	4	280	700	.4

Observations

The following comments and observations are offered in support of the quantitative evaluation of SIRS.

(A) Product Scope and Function

Pre-Registration:	- is good and fast.
Detailed Data Items:	- the package provides some of the key data items but does miss some of the most essential fields such as Feeder School, previous schools, religious denomination and certain medical information. Most importantly, there are no user defined fields. It is vital that schools have the flexibility to define their own student demographic data. - Instructor information is basic with again, no user defined fields. Course information is very limited and really falls short of minimum criteria.
Reports/Inquiries:	- Inquiry facilities are virtually non-existent. Reporting is very limited and very poor in quality. During the test, a number of hand-written reports were needed to track the set up and development of data. No facilities exist for the generation of user-defined reports, there is no report generator and no data file layouts.
Scheduling:	- Basic data entry and manual scheduling (ARENA) are acceptable and workable. Manual entry of course requests is confusing and tedious. There are no automated entry facilities. - Editing and validation of course requests involves a 2 stage batch process. There is no interaction with the user and the results are poorly presented and can be confusing. - Pre-scheduling reports are available, but fairly limited in their usefulness. Several of the reports, especially exception reports, in the selection criteria are not available. - The Master schedule builder produces a good manual schedule; there are no automatic schedule builder facilities. Some scheduling units can not be handled. Most essential features, such as rotation/tumble and different numbers of periods per day can be handled.

- The scheduling process is fairly poor in the areas of interaction and user parameters - these were "stripped" out for the IBM implementation. Scheduling of small groups of students is impossible as is the ability to keep scheduling open after the start of the school year. Most other features such as restart capability, blocking and section balancing are handled well but with no user control.
- Scheduling reports are poor; inquiries are virtually non-existent. Student timetables and "partials" can be generated. After running the Load/Print batch process, class lists can be generated.
- Homeroom grouping is handled in a fashion although there is no user control over the actual students within each group. It is the fact that Junior High schools have large core subject groupings that causes the scheduler to produce such poor results. After filling the timetable from optional courses (which have fewer sections offered) it is very difficult to fit the 15 or 16 period core groups into the timetable.

Student Attendance:

- Attendance software was tested in outline and was found to be acceptable in most areas.
- Manual entry is fairly difficult due to the absence of key reports; there are no automated (scanner) facilities. There is a limited number of absence codes and attendance can be recorded at different intervals (most junior high schools record attendance at the half day level).
- Reporting is fairly poor with some key reports missing and layout on the working reports very poor. There are no user defined reporting facilities, an important requirement in this area.

Student Marks:

- This area was also tested in outline and was found to be reasonable in most functions.
- Manual entry of data was straight forward but tedious; there is no automated facility. Most marks data requirements were met, but student exam facilities were poor.

- Reports and Inquiries were acceptable in this area, but certain key reports were missing and inquiry facilities were minimal.

Utility Functions:

Backup and Restore are handled through the IBM PC DOS operating system utilities of the same name: SIRS does not have its own backup/restore software.

There were no security controls in the software which was purchased for evaluation, although there may be facilities of this kind on the multi-user NCR or ALTOS systems.

(B) Ease of Use

The package is not easy to use despite the menu facilities and the modularity of the code (built as a series of COBOL objects).

Several menus lead to the wrong program or facility; there are no "help" facilities; the system is not flexible or adaptable.

(C) Technical Considerations:

The SIRS system runs on the IBM PC range of microcomputers but does not take advantage of many of the features of the machine - fast screen painting, spooling, disk caching to memory, etc.

The RM COBOL system runs fairly well but slowly under the PC DOS operating system; it doesn't appear to have "hooks" into the operating system directly.

Standard PC DOS Utilities were used throughout the test and it would seem that the SIRS package has no utilities.

No technical information or programmer information was provided and we can only surmise that the database management system is a standard facility provided by Ryan McFarland (the vendor of RM COBOL).

Networking (using a Local Area Network) was not feasible and there were no user hooks provided for the Junior High system. (Two RM COBOL programs were provided for the Senior High system for the loading of data). The system was modular insofar that it was composed of a number of COBOL modules.

(D) Support and Services:

There was basically no real support and minimal training. Training consisted of a 1 hour session where the software was copied onto the IBM XT and started up.

One modification was produced - to allow up to 9 core subjects to be grouped - but there were no general release plans announced.

Documentation is poor and untidy. There is no "roadmap" and no startup list. A school administrator would not be able to use the system with the documentation provided.

There were no training or setup plans provided by the vendor. Similarly there was no implementation plan with the result that on a number of occasions data was punched into the wrong database file.

(E) Product Qualifications:

The package has been developed and maintained since 1979 and is fairly stable with some new releases planned. The vendor plans to recode some of the programs in "C" and improve "core grouping". There are only 7 installations, not all of which are junior high schools, using the package (some of these installations, for example, Rocky Mountain House, have not yet used the scheduler).

(F) Vendor:

The vendor is locally based, in St. Albert, and has installed a few SIRS systems within Alberta. Vendor stability and corporate information is poor and experiences tended to be neutral. It is a small, local company and would not be able to support multiple problems at different sites.

6.1.3 System Performance, Strengths and Weaknesses - SIRS (MIG)

Key Performance Indicators

School Test Site	Parameter	IBM PC/XT
Steele Heights	Scheduler - Time	2:34 hours
	Scheduler - Performance	81%
	Scheduler - Expected Perf.	99%
	Timetables	2:00 hours
	Conflict Matrix	1:00 hour
	Course Tally	0:32 hour
	Master Schedule	2:15 hour
	Class Lists	2:00 hours
	Attendance Registers and Rpt	3:30 hours
	Marks Registers	42 min.
	Student Registers	2:00 hours

Steele Heights Junior High School: 646 students

(All times are in hours:minutes)

System Strengths:

Mainframe compatibility:	Ryan McFarland, the producers of RM COBOL, have developed a VM/CMS version of this package which works on the IBM 4341 mainframe. Thus, minor modifications to COBOL source and JCL should result in a mainframe version of SIRS.
User friendly:	The package is fairly interactive and at no time did it give system errors or "abends".
Spooler function:	While reports cannot be spooled to the printer (in common with other micro-computer packages), there is an option to spool to disk for later printing.
Core subject grouping:	SIRS provides facilities for grouping core subjects together, thus forcing common sections for groups of students. This is essential in junior high Schools.

System Weaknesses:

Reports:	The reports are very poor and not well described in the menu programs. In most cases, we were unable to get the information required to verify data and proceed to the next stage of development. Hand written forms had to be designed and updated constantly.
Database files:	SIRS appears to hold two sets of files with some very confusing results. On two occasions fairly large amounts of data were keyed into the wrong file and had to be re-entered.
Logical steps:	There were too many steps required in designing the Class Master Schedule and running the Scheduler. Each step was separated by long periods of waiting to enter the next command due to the absence of batch or indirect command file control.
Scheduling results:	The Load/Print and Simulation phases did not provide clues as to what had caused classes to conflict. In general, there were few audit trails or details of errors.
Documentation:	No guidelines explaining the sequence of operations.

Specific Systems Problems:

No Section "forcing":	for example student #7107 requested two sections of the Maths Support course but there was no facility for specifying a particular section or sections.
Current Grade:	All students were entered as currently operating within the school. When the Scheduler Student/Request edit list was run, all students were flagged as being in the wrong grade and every record required editing.
No "Edit/Error only" listings	Student Requests and Marks/Attendance data entry did not have reports describing errors only.
Request File:	No summary listing of the Request File.

6.2 Evaluation of TSS

6.2.1 Testing Environment and Conditions

The same school, Steele Heights Junior High School, that was used for the MIG SIRS tests was also used to pilot test The School System. The school has 646 students enrolled in grades 7,8 and 9. It uses a strict 4 day, 6 period rotation schedule and operates attendance at the half-day reporting period level.

The School System was tested on an IBM PC/XT with 10 Mbytes hard disc storage, 512 kb memory, an Okidata Microline 84 printer operating at about 160 c.p.s and a 360 kb diskette drive. The system supports two or more users but this feature was not tested.

Data entry was entirely by keyboard for this test although data loading facilities from the mainframe computer can be accomplished using the virtual scan input mechanism.

6.2.2 Evaluation Results and Observations

The following tables show the outcome of the quantitative evaluation of TSS against the detailed evaluation criteria.

EVALUATION FACTOR	CRITERIA ITEMS	WEIGHT (W)	SCORE (S)	WEIGHTED SCORE (W X S)	MAX WT SCORE (W X S_{max})	WT SCORE/MAX WT SCORE
PRODUCT SCOPE & FUNCTION	**SCHOOL RECORDS**					
	Pre-Registration/Enrollment					
	Create student record	15	6	90		
	- school student I.D. - last name - middle name - first name - birthdate - current grade - sex - feeder school - home address					
	Registration confirmation notice	3	5	15		
	Feeder school confirmation notice	2	4	8		
	TOTAL Pre-Registration/Enrollment	20	15/30	113	200	.56
	Detailed Data Items					
	Student information	25	9	225		
	- school student I.D. - District student I.D. - Alberta Education student I.D. - last name - middle name - first name - birthdate - current grade - sex - feeder school - home address - telephone number					

EVALUATION FACTOR	CRITERIA ITEMS	WEIGHT (W)	SCORE (S)	WEIGHTED SCORE (W X S)	MAX WT SCORE (W X S_{max})	WT SCORE/MAX WT SCORE
	- emergency contact					
	- name					
	- telephone					
	- entry information					
	- entry date					
	- registration code					
	- withdrawal code					
	- previous schools (2)					
	- homeroom instruction					
	- counsellor					
	- parent/guardian information (up to 4)					
	- name					
	- address					
	- telephone (home and business)					
	- relationship					
	- occupation					
	- locker information					
	- number					
	- combination					
	- student indebtedness					
	- religious denomination					
	- program type					
	- number of credits earned					
	- this school					
	- other schools					
	- academic history					
	- travel information					
	- method					
	- distance					
	- bus pass information					
	- parking information					
	- driver's licence					
	- licence plate					
	- parking space					
	- medical information					
	- disabilities/behaviours					
	- medications					
	- allergies					

EVALUATION FACTOR	CRITERIA ITEMS	WEIGHT (W)	SCORE (S)	WEIGHTED SCORE (W X S)	MAX WT SCORE (W X S_{max})	WT SCORE/MAX WT SCORE

	- date of last medical
	  - physician information
	  - health care number
	- departure information
	  - date
	  - reason
	- minimum of 6 user defined fields					

	Instructor Information	5	5	25		
	- instructor code - name - address - telephone - social insurance number - language of instruction - certificate number - courses taught - minimum of 6 user defined fields					
	Course information	15	9	135		
	- course code (5 character alpha-numeric) - description - pre-and co-requisites (minimum of 4) - must handle"and"/"or"situation - course type - language of instruction - course accreditation - credit value (2 digits) - pass/fail mark - grade					
	TOTAL Detailed Data Items	45	23/30	385	450	.85

EVALUATION FACTOR	CRITERIA ITEMS	WEIGHT (W)	SCORE (S)	WEIGHTED SCORE (W X S)	MAX WT SCORE (W X S_{max})	WT SCORE/MAX WT SCORE
	Reports/Inquiries	25	7	175		
	All reports and inquiries should be available for all or a specified range of records, in various sort orders.					
	- class lists - homeroom lists - student name labels - student address labels - parent address labels - student I.D. cards - student data (alphabetical or numerical order) - parent data (alphabetical or numerical order) - instructor data (alphabetical or numerical order) - course data - student phone list - student name list - student grade list - feeder school list - locker information list - student population by instruction type - fee sheets					
	The system should allow production of user-defined reports/inquiries using available data.					
	TOTAL Reports/Inquiries	25	7	175	250	.7
	TOTAL SCHOOL RECORDS	90	45/70	673	900	.74

EVALUATION FACTOR	CRITERIA ITEMS	WEIGHT (W)	SCORE (S)	WEIGHTED SCORE (W X S)	MAX WT SCORE (W X S_{max})	WT SCORE/MAX WT SCORE
	SCHEDULING					
	Detailed Data Items					
	- Course code - Course section					
	Manual scheduling (Arena Scheduling)	7	9	63		
	Pre-scheduling					
	Course Requests					
	manual entry	5	9	45		
	automated entry	9	10	90		
	- allow student to specify mandatory/ compulsory courses, - preferred courses, preferred alternatives, etc. - allow student to specify preferred section, semester, or instructor					
	Edit and validation of course requests	7	9	63		
	- checking of pre- and co-requisites in the current students' requests as well as history files - capability to override pre- and co-requisites - capability to complete pre-requisite checking for students from other District schools.					
	Pre-scheduling reports	9	8	72		
	- potential conflict matrix — for all or a specified range of courses. Additional selection criteria may be					

EVALUATION FACTOR	CRITERIA ITEMS	WEIGHT (W)	SCORE (S)	WEIGHTED SCORE (W X S)	MAX WT SCORE (W X S_{max})	WT SCORE/MAX WT SCORE
	based on the number of requests or the number of sections.					
	- course tally					
	- students with no requests					
	- student course request list					
	- min/max request list					
	- min/max credit list					
	- verification tickets					
	- arena scheduling labels					
	- students missing compulsory courses					
	- students requesting specific course or group of courses					
	Master schedule builder					
	Capability to build a master schedule					
	manually	6	9	54		
	automatically	9	0	0		
	Capability of handling a variety of Scheduling units	9	7	63		
	- full year					
	- semester					
	- trimester					
	- quartermester					
	- 6 week unit					
	- any combination of the above					
	User defined timetable rotation/tumble	10	10	100		
	Flexible number of periods per day	10	10	100		
	Capability to specify exclusive male or female sections	5	8	40		
	Capability to maintain current and future year/semester master schedules	8	5	40		

EVALUATION FACTOR	CRITERIA ITEMS	WEIGHT (W)	SCORE (S)	WEIGHTED SCORE (W X S)	MAX WT SCORE (W X S_{max})	WT SCORE/MAX WT SCORE
	Scheduling Process					
	User defined scheduling sequence - low grades first - high grades first - A to Z - Z to A	6	5	30		
	Unscheduling of no-shows/withdrawals	5	10	50		
	Scheduling of individual student or small groups of students	6	8	48		
	Capability to reset all students or partially scheduled students	8	10	80		
	Capability to lock scheduling assignments for all students or a group of students	8	10	80		
	Restart capability	8	0	0		
	Course weighting/semester balancing (ensure even course load for students)	8	7	56		
	Blocking of courses	7	10	70		
	Section balancing	8	8	64		
	Class balancing (males-females)	4	7	28		
	Capability to keep scheduling open after school start while starting to use the attendance module	9	9	81		
	Scheduling Reports/Inquiries	10	9	90		
	- student timetables — grid and list format - instructor timetables — grid and list format - room timetables — grid and list format - master schedule - student scheduling conflicts - students partially scheduled - unassigned time					

EVALUATION FACTOR	CRITERIA ITEMS	WEIGHT (W)	SCORE (S)	WEIGHTED SCORE (W X S)	MAX WT SCORE (W X S_{max})	WT SCORE/MAX WT SCORE
	Junior High Scheduling Requirements					
	Homeroom grouping for core subjects	9	9	81		
	Capability of scheduling any course in any combination and number of time periods	10	10	100		
	TOTAL SCHEDULING	200	206	1588	2000	.79
	STUDENT ATTENDANCE					
	Entry of Attendance Data					
	manual entry	5	9	45		
	automated entry	9	10	90		
	Multiple user-defined absence types	8	10	80		
	Capability to record attendance data at various intervals	10	10	100		
	- daily - twice per day - period by period - subject by subject					
	Attendance history	8	9	72		
	- at least ten days detail - cummulative totals					
	Attendance reports/inquiries	10	6	60		
	- student by class - student by subject - student by period					

EVALUATION FACTOR	CRITERIA ITEMS	WEIGHT (W)	SCORE (S)	WEIGHTED SCORE (W X S)	MAX WT SCORE (W X S_{max})	WT SCORE/MAX WT SCORE
	- homeroom attendance - daily summary - weekly summary - monthly summary - multiple absence - capability to produce unexcused absence report for the current day within 30 minutes - the system should allow user defined reports/inquiries using available data					
	TOTAL ATTENDANCE	50	54/60	447	500	.89
	STUDENT MARKS					
	Entry of marks data					
	manual	5	9	45		
	automated	9	10	90		
	Marks data	10	10	100		
	- minimum of 4 term marks plus final mark - letter or percentage grades					
	Student Exams	6	0	0		
	Exam timetable builder					
	- automated - manual					
	Exam Reports/Inquiries					
	- potential exam conflict matrix - exam schedules					

EVALUATION FACTOR	CRITERIA ITEMS	WEIGHT (W)	SCORE (S)	WEIGHTED SCORE (W X S)	MAX WT SCORE (W X S_{max})	WT SCORE/MAX WT SCORE
	Reports/Inquiries	10	6	60		
	proof list report cards - marks data - final mark, calculated according to user-defined formula attenandance data - class averages - honour lists - potential failure lists - graduation list					
	TOTAL STUDENT MARKS	40	35/50	295	400	.74
	UTILITY FUNCTIONS					
	Backup/Restore	12	8	96		
	Security/Controls	8	0	0		
	TOTAL UTILITY FUNCTIONS	20	8/20	96	200	.48
	GRAND TOTAL, PRODUCT SCOPE AND FUNCTION	400	348/460	3099	4000	.7747
EASE OF USE	- flexibility - modular, table driven - help facilities - menu driven	60	9	540		
	GRAND TOTAL, EASE OF USE	60	9	540	600	.9

EVALUATION FACTOR	CRITERIA ITEMS	WEIGHT (W)	SCORE (S)	WEIGHTED SCORE (W X S)	MAX WT SCORE (W X S_{max})	WT SCORE/MAX WT SCORE

TECHNICAL CONSIDERATIONS	- hardware
	- system software environment
	  - operating system
	  - utilities
	  - database management/system internals/files
	  - networking capabilities
	  - user hooks
	  - modularity of the system
		80	10	800		

	GRAND TOTAL, TECHNICAL CONSIDERATIONS	**80**	**10**	**800**	**800**	**1.0**

SUPPORT & SERVICES	- local versus where/how far
	- package support and services
	  - software support, custom modifications
	- documentation
	  - user guide, application system, procedural, operations guide, file layouts
	- training
	  - applications system, operational (DP), availability schedule, format, location, prerequisites
	- implementation
	  - training
	  - initialization (conversion,file set-up, output forms)
	  - implementation plan
		70	9	630		

	GRAND TOTAL, SUPPORT & SERVICES	**70**	**9**	**630**	**700**	**.9**

EVALUATION FACTOR	CRITERIA ITEMS	WEIGHT (W)	SCORE (S)	WEIGHTED SCORE (W X S)	MAX WT SCORE (W X S_{max})	WT SCORE/MAX WT SCORE
PRODUCT QUALIFICATIONS		80	9	720		
	- package background - reliability - current development status - number of installations - product development plans - release concept, portability, verticality					
	GRAND TOTAL, PRODUCT QUALIFICATIONS	80	9	720	800	.9
VENDOR		70	8	560		
	- Corporate information - background and history - financial performance - employee base - Market volatility and vendor stability - References - Contractual Terms - maintenance - warranty - ownership rights - discount structure/price limit					
	GRAND TOTAL, VENDOR	70	8	560	700	.8

Observations

(A) Product Scope and Function

Junior High Requirements

The system allows homeroom grouping using course relationships.

Enrolment of students in a group of classes is allowed, for example, core classes. This is achieved very quickly using the auto course selection option.

Flexible timetable rotation allows scheduling of any class in any combination of periods.

All other criteria observations are listed in section 4.2.2 for Senior High schools and, in this case, are pertinent for the junior high school evaluation.

6.2.3 System Performance, Strengths and Weaknesses - TSS (Columbia)

Key Performance Indicators

School Test Site	Parameter	IBM PC/XT
Steele Heights	Scheduler - Time (0:40 hours)	1:35 hours
	Scheduler - Performance	100%
	Scheduler - Expected Perf.	100%
	Timetables	7:30 hours
	Conflict Matrix	1:50 hours (extrapolated)
	Course Tally	0:15 hour
	Master Schedule	0:15 hour
	Class Lists	3:30 hours
	Attendance Registers	3:30 hours
	Marks Registers	3:30 hours
	Student Registers	1:30 hours

Steele Heights Junior High School: 646 students

(All times are in hours: minutes)

System Strengths:

- capability of handling homeroom grouping
- ability to schedule any course in any combination and/or number of periods
- capability of handling with ease any rotation tumble for any number of periods.
- Also see section 4.2.3

System Weaknesses: (see Senior High School descriptions in Section 4.2.3)

7.0 COMPARATIVE EVALUATION OF SIMS - JUNIOR HIGH SCHOOL PERSPECTIVE

7.1 Comparison Summary and Review of SIMS Evaluation Data

The following tables show the quantitative evaluation data for the two microcomputer based SIMS which were evaluated in detail at the junior high school level. As was the case of the senior high school perspective, the Detailed Scoring Comparison Form has been used to display the data. A third system, the School Administration System by SIERRA was also evaluated at the junior high school level. This particular system, which runs on the Digital Equipment Corporation's (DEC) VAX family of computers, was evaluated using a VAX 11/725 minicomputer. In view of this, the outcomes of the evaluation are included within a separate report. It should be noted, however, that because the system runs on a smaller more affordable VAX computer called the MICROVAX, the results of the evaluation may be of interest to schools seeking a microcomputer based solution.

Detailed Scoring Comparison - Junior High School Perspective

EVALUATION FACTOR	CRITERIA ITEMS	WEIGHT	TSS		SIRS	
		(W)	SCORE (S)	WEIGHTED SCORE (W X S)	SCORE (S)	WEIGHTED SCORE (W X S)
PRODUCT SCOPE & FUNCTION	**SCHOOL RECORDS**					
	Pre-Registration/Enrollment					
	Create student record	15	6	90	8	120
	Registration confirmation notice	3	5	15	0	0
	Feeder school confirmation notice	2	4	8	0	0
	TOTAL Pre-Registration/Enrollment	20	15/30	113	8/30	120
	Detailed Data Items					
	Student information	25	9	225	4	100
	Instructor Information	5	5	25	5	25
	Course information	15	9	135	2	30
	TOTAL Detailed Data Items	45	23/30	385	11/30	155
	Reports/Inquiries	25	7	175	2	50
	TOTAL Reports/Inquiries	25	7/10	175	2/10	50
	TOTAL SCHOOL RECORDS	90	45/70	673	21/70	325
	SCHEDULING					
	Manual scheduling (Arena Scheduling)	7	9	63	6	42

EVALUATION FACTOR	CRITERIA ITEMS	WEIGHT (W)	TSS		SIRS	
			SCORE (S)	WEIGHTED SCORE (W X S)	SCORE (S)	WEIGHTED SCORE (W X S)
	Pre-scheduling					
	Course Requests					
	manual entry	5	9	45	2	10
	automated entry	9	10	90	0	0
	Edit and validation of course requests	7	9	63	4	28
	Pre-scheduling reports	9	8	72	4	36
	TOTAL Pre-Scheduling	30	36/40	270	10/40	74
	Master schedule builder					
	Capability to build a master scheduler					
	manually	6	9	54	8	48
	automatically	9	0	0	0	0
	Capability of handling a variety of scheduling units	9	7	63	4	36
	User defined timetable rotation/tumble	10	10	100	4	40
	Flexible number of periods per day	10	10	100	6	60
	Capability to specify exclusive male or female sections	5	8	40	7	35
	Capability to maintain current and future year/semester master schedules	8	5	40	5	40
	TOTAL Master Schedule Builder	57	49/70	397	34/70	259
	Scheduling Process					
	User defined scheduling sequence	6	5	30	4	24
	Unscheduling of no-shows/withdrawals	5	10	50	5	25

EVALUATION FACTOR	CRITERIA ITEMS	WEIGHT (W)	TSS SCORE (S)	TSS WEIGHTED SCORE (W X S)	SIRS SCORE (S)	SIRS WEIGHTED SCORE (W X S)
	Scheduling of individual student or small groups of students	6	8	48	0	0
	Capability to reset all students or partially scheduled students	8	10	80	5	40
	Capability to lock scheduling assignments for all students or a group of students	8	10	80	10	80
	Restart capability	8	0	0	8	64
	Course weighting/semester balancing (ensure even course load for students)	8	7	56	5	40
	Blocking of courses	7	10	70	8	56
	Section balancing	8	8	64	8	64
	Class balancing (males-females)	4	7	28	4	16
	Capability to keep scheduling open after school start while starting to use the attendance module	9	9	81	0	0
	TOTAL Scheduling Process	77	84/110	587	57/110	409
	Scheduling Reports/Inquiries	10	9	90	3	30
	Junior High Scheduling Requirements					
	Homeroom grouping for core subjects	9	9	81	4	36
	Capability of scheduling any course in any combination and number of time periods	10	10	100	4	40
	TOTAL SCHEDULING	200	206/260	1588	118/260	890
	STUDENT ATTENDANCE					
	Entry of Attendance Data					
	manual entry	5	9	45	5	25
	automated entry	9	10	90	0	0

EVALUATION FACTOR	CRITERIA ITEMS	WEIGHT	TSS		SIRS	
		(W)	SCORE (S)	WEIGHTED SCORE (W X S)	SCORE (S)	WEIGHTED SCORE (W X S)
	Multiple user-defined absence types	8	10	80	6	48
	Capability to record attendance data at various intervals	10	10	100	6	60
	Attendance history	8	9	72	5	40
	Attendance reports/inquiries	10	6	60	3	30
	TOTAL ATTENDANCE	50	54/60	447	25/60	203
	STUDENT MARKS					
	Entry of marks data					
	manual	5	9	45	7	35
	automated	9	10	90	0	0
	Marks data	10	10	100	6	60
	Student Exams	6	0	0	4	24
	Exam timetable builder Exam Reports/Inquiries					
	Reports/Inquiries	10	6	60	5	50
	TOTAL STUDENT MARKS	40	35/50	295	22/50	169

EVALUATION FACTOR	CRITERIA ITEMS	WEIGHT (W)	TSS SCORE (S)	TSS WEIGHTED SCORE (W X S)	SIRS SCORE (S)	SIRS WEIGHTED SCORE (W X S)
	UTILITY FUNCTIONS					
	Backup/Restore	12	8	96	6	72
	Security/Controls	8	0	0	0	0
	TOTAL UTILITY FUNCTIONS	20	8/20	96	6/20	72
	GRAND TOTAL, PRODUCT SCOPE AND FUNCTION	400	348/460	3099	192/460	1659
EASE OF USE		60	9	540	5	300
	GRAND TOTAL, EASE OF USE	60	9/10	540	5/10	300
TECHNICAL CONSIDERATION		80	10	800	3	240
	GRAND TOTAL, TECHNICAL CONSIDERATIONS	80	10/10	800	3/10	240
SUPPORT & SERVICES		70	9	630	2	140
	GRAND TOTAL, SUPPORT & SERVICES	70	9/10	630	2/10	140

EVALUATION FACTOR	CRITERIA ITEMS	WEIGHT	TSS		SIRS	
		(W)	SCORE (S)	WEIGHTED SCORE (W X S)	SCORE (S)	WEIGHTED SCORE (W X S)
PRODUCT QUALIFICATIONS		80	9	720	4	320
	GRAND TOTAL, PRODUCT QUALIFICATIONS	80	9/10	720	4/10	320
VENDOR		70	8	560	4	280
	GRAND TOTAL, VENDOR	70	8/10	560	4/10	280

7.2 Relative Suitability of SIMS to the Junior High Schools

The relative suitability of SIMS to the junior high schools was determined using the same procedure and the same percent emphasis distribution as was used in the senior high school situation (see section 5). The outcome of this procedure is shown in the table below.

EVALUATION FACTOR	EMPHASIS (%)	RELATIVE PRODUCT SUITABILITY	
		TSS	**SIRS**
PRODUCT SCOPE AND FUNCTION	45	34	18
EASE OF USE	10	9	5
TECHNICAL CONSIDERATIONS	10	10	3
SUPPORT AND SERVICES	15	13	3
PRODUCT QUALIFICATIONS	10	9	4
VENDOR	10	8	4
TOTALS	**100**	**83**	**37**

The following two tables parallel the simulations which were provided relative to the senior high school situation. Appendix 6 shows yet another simulation in which not all of the evaluation criteria were used and in which the actual criteria weighting factors were adjusted to the needs of a particular user. This particular simulation has been performed using senior high school data but the principles involved are equally applicable to the junior high school data.

SIMULATION 1 - JUNIOR HIGH PERSPECTIVE

EVALUATION FACTOR	EMPHASIS (%)	RELATIVE PRODUCT SUITABILITY	
		TSS	**SIRS**
PRODUCT SCOPE AND FUNCTION	55	42	22
EASE OF USE	20	18	10
TECHNICAL CONSIDERATIONS	5	5	1
SUPPORT AND SERVICES	10	9	2
PRODUCT QUALIFICATIONS	5	4	2
VENDOR	5	4	2
TOTALS	**100**	**82**	**39**

SIMULATION 2 - JUNIOR HIGH PERSPECTIVE

EVALUATION FACTOR	EMPHASIS (%)	RELATIVE PRODUCT SUITABILITY	
		TSS	**SIRS**
PRODUCT SCOPE AND FUNCTION	50	38	20
EASE OF USE	20	18	10
TECHNICAL CONSIDERATIONS	10	10	3
SUPPORT AND SERVICES	-	-	-
PRODUCT QUALIFICATIONS	20	18	8
VENDOR	-	-	-
TOTALS	**100**	**84**	**41**

8.0 COMMENTS AND CONCLUSIONS

The major objective of this evaluation project was to comparatively evaluate microcomputer based School Information Management Systems and, in the process, to determine the viability of their use by schools.

Three systems were evaluated against the same detailed set of criteria and in IBM Microcomputer environments. Initial experiences of the project team indicated that the application of microcomputers to school information management was not well established. Software products were not mature and the hardware environments in which they would run were not at all well defined. The School System by Columbia, for example, did not exist as a practical alternative when the project began. During the course of the project, this application of the technology matured considerably to the point that not only are such applications possible now but there are alternatives from which to choose.

We are able to conclude from this project that at least one, and probably two, microcomputer based SIMS are available which allow a distributed approach to the school records, student scheduling, attendance and progress tracking and reporting functions. The results of this project further show that one system, notably, The School System by Columbia Computing Services, can effectively meet the needs of both the junior and senior high schools. This is a particular advantage to districts or jurisdictions which seek to recommend and support a single alternative for all high schools. From the senior high school perspective, The School System scored seventy six of one hundred suitability points compared to sixty two of one hundred points awarded to Management Information Group's Student Information and Records System. The project showed the relative suitability of The School System to the needs and requirements of the junior high schools to be even more pronounced.

The choice of systems, however, should be made only after very careful consideration. The software systems which were evaluated ranged in price from about four thousand to six and a half thousand dollars and are thus considered to be affordable. They can be effectively run on single user IBM microcomputers with hard disk drives which provide sufficient capacity to accommodate the needs of even the largest senior high schools. The two microcomputers which were found to be most appropriate were the IBM PC/XT and the IBM PC/AT with the latter clearly being the preferred choice. A typical IBM PC/AT configuration (single user) with a printer will cost a user of the order of seven or eight thousand dollars.

Those considering the implementation of one of the microcomputer based SIMS alternatives which were tested through this work should carefully examine the process for determining product suitability and re-apply it to the raw evaluation data from their particular perspective. Those who seek to identify another alternative are encouraged to apply the principles of this process to the maximum extent possible.

In closing, it is noted that the project reported on here is part of a more comprehensive evaluation of the distributed approach to school information management. A further report will address the viability of a minicomputer based approach to school information management.

APPENDIX 1

GENERAL QUESTIONNAIRE

This document was distributed to schools for completion as an initial information gathering step in the process to develop evaluation and selection criteria for school information management systems.

EDMONTON PUBLIC SCHOOLS
COMPUTERIZATION OF SCHOOL ADMINISTRATIVE/INFORMATION SYSTEMS

GENERAL QUESTIONNAIRE

Background

The Distributed Systems Services Team has identified a short list of computer software packages specifically designed for the day-to-day student administrative requirements of individual schools. In order to facilitate the selection of the most suitable software alternative, for the EPSD from a District-wide perspective, the attached questionnaire has been prepared with a view of determining the relative importance of the type of information, system functions and features needed by the school(s). In addition, personal interviews will be conducted with each participating school in order to determine each school's specific information requirements, review the type and detail of data needed by the school to streamline its operations and identify any areas of concern.

The questionnaire has been divided into two parts. Part 1 deals with the information needs of a STUDENT ADMINISTRATIVE SYSTEM and Part 2 addresses other information requirements that the school(s) may have.

Part 1 - STUDENT ADMINISTRATIVE SYSTEM

Each item is to be weighted in accordance to its relative importance to the specific institution completing the questionnaire, using the following rating scale.

NONE - Not required.

OPT - "Optional" - a requirement not considered essential but for which preference may be given

IMP - "Should" ("Desireable") ("Important") - a requirement having a significant degree of importance to the objectives of the Student Administrative/Information System

MUST - Mandatory - a requirement that must be met in a substantially unaltered form in order for the software package to meet the schools vital information needs.

Part 2 - OTHER INFORMATION SYSTEMS

Applications should be ranked in accordance with the school's priority to computerize other areas of its operations.

NAME OF SCHOOL (in full) ______________________________

____

Questionnaire completed by: (Name) ______________________________

(Title) ______________________________

PART 1

STUDENT ADMINISTRATION SYSTEM - INFORMATION NEEDS

SECTION A - School records, student records, attendance recording/reporting, student marking process and reporting requirements.

General Overview of the System's Objectives

A computerized student administrative system to resolve and streamline the collecting, transcribing, maintaining and reporting of student data. It is to maintain student related data, provide up-to-date information and prepare reports that are used by administrators, counsellors, instructors, students and parents.

Information Need - Relative Rating Scale Legend:

		Relative Importance			
Column Heading	-	NONE	OPT	IMP	MUST
Degree of importance	-	Not required	Optional	Important	Mandatory

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Application/Feature Description	Relative Importance			
	NONE	OPT	IMP	MUST
1) **Registration/Enrollment**				
-Entering a student into the school and creating the student record	____	____	____	____
-Registration/Enrollment confirmation notice	____	____	____	____
-Other information needs (specify):				
____________________	____	____	____	____
____________________	____	____	____	____
____________________	____	____	____	____
____________________	____	____	____	____
2) **Student Records**				
-Demographic data e.g. name and address, program, type of instruction, medical, class(es), timetable, medical, parents, etc.	____	____	____	____
-History i.e. academic achievements, marks, course attempts, etc.	____	____	____	____
-Student coding e.g.				
- school ID#	____	____	____	____
- EPSD & Alerta student ID #	____	____	____	____
-Bus Information e.g. bus pass number, pick-up and drop off points, driver name, bus routes etc.	____	____	____	____
-Interface/integration with your school's accounting system (in future)	____	____	____	____
-Other (specify)				
____________________	____	____	____	____
____________________	____	____	____	____
____________________	____	____	____	____
____________________	____	____	____	____

Application/Feature Description	Relative Importance			
	NONE	OPT	IMP	MUST
3) **Student Attendance**				
-Indicate the frequency that attendance is/should be taken in your school e.g. every period (by class) once per day, twice per day, at homeroom time, etc.				
-How often do you need attendance reports e.g. daily, weekly, bi-weekly, etc.?				
-How much detailed attendance history does your school require to keep "on-line" for parent, counsellor inquiries e.g. 5 days history, 6 days history etc.?				
-What types of attendance reports do you need? e.g. by student, student by class/subject, student by day, exception reports etc. and how frequently do you require each report?				
4) **School Reports**				
-Directories/class lists				
-Labels (mailing)				
-Student ID cards				
-Schedules (student, teachers, rooms)				
-Other reports (specify)				

Application/Feature Description	Relative Importance			
	NONE	OPT	IMP	MUST

5) Instructor Records

-Personal and demographic information	____	____	____	____
-Courses taught	____	____	____	____
-Areas of specialty	____	____	____	____
-Certificate number	____	____	____	____
-Other (specify)				
________________________	____	____	____	____
________________________	____	____	____	____
________________________	____	____	____	____
________________________	____	____	____	____

6) Student Marking Process

-Comprehensive editing and validation of student marks prior to report card preparation e.g. mark verification, identification of student with unassigned marks etc.	____	____	____	____
-Report card printing	____	____	____	____
-Type of reports e.g. GPA's, honour lists, etc. (Please specify):				
________________________	____	____	____	____
________________________	____	____	____	____
________________________	____	____	____	____
________________________	____	____	____	____
________________________	____	____	____	____
-Other information needs (specify):				
________________________	____	____	____	____
________________________	____	____	____	____
________________________	____	____	____	____
________________________	____	____	____	____
-What is the maximum number of marks per course maintained by your school for a student e.g. 4 mid-term marks, 2 exams and a final mark?				
________________________	____	____	____	____
________________________				
________________________				
________________________				
________________________				

Application/Feature Description	Relative Importance			
	NONE	OPT	IMP	MUST
7) Student Exams				
-Exam timetable builder	____	____	____	____
-Exam conflicts matrix	____	____	____	____
-Exam schedules	____	____	____	____
-Other (specify)				
________________	____	____	____	____
________________	____	____	____	____
________________	____	____	____	____
________________	____	____	____	____
8) Courses				
-Course number, short description, detailed description (for annual school handbook), credit values, prerequisites, etc.	____	____	____	____
-Other information requirements (specify):				
________________	____	____	____	____
________________	____	____	____	____
________________	____	____	____	____
________________	____	____	____	____
________________	____	____	____	____

SECTION B - STUDENT SCHEDULING

Course requests, prerequisite verfication, request confirmation, student curricular counselling, computerized scheduling, school start up registration, automatic generation of student fee sheets and printing of individual timetables.

THIS SECTION IS APPLICABLE TO HIGH SCHOOLS,

JUNIOR HIGH SCHOOLS AND ELEMENTARY-JUNIOR

HIGH SCHOOLS ONLY

SECTION B - STUDENT SCHEDULING

Course requests, prerequisite verification, request confirmation, student curricular counselling, computerized scheduling, school start up registration, automatic generation of student fee sheets and printing of individual timetables.

Application/Feature Description	Relative Importance			
	NONE	OPT	IMP	MUST
1) Pre-scheduling				
-Comprehensive editing and validation of course requests e.g. prerequisite checking marks verification, identification of students with no requests, insufficient/excessive credits requested	___	___	___	___
-Prescheduling reports e.g. course tally list, exception reports (students missing mandatory/compulsory courses)	___	___	___	___
-Scheduling conflicts matrix	___	___	___	___
-Other information needs (specify):				
___	___	___	___	___
___	___	___	___	___
___	___	___	___	___
-Other prescheduling reports (specify):				
___	___	___	___	___
___	___	___	___	___
___	___	___	___	___
___	___	___	___	___
2) Master Schedule				
-Master timetable builder	___	___	___	___
i) What course code would you prefer to use e.g. a school course code, EPSD course code or the Alberta course code				
___	___	___	___	___
___				
ii) Please specify ALL of the scheduling units used by your school, e.g. semester full year, trisemester, six week section, quartermester, etc.				
___				
___				
___				

Application/Feature Description	Relative Importance NONE	OPT	IMP	MUST

iii) Please specify the following:
Rotation: ____________________________
Days per week: ______________________
Periods per week: ____________________
used in your school's master timetable.

3) Student Scheduling

Application/Feature Description	NONE	OPT	IMP	MUST
-Completion of the student scheduling process before the summer break				
-Ability to preassign sections				
-Ability for your school to assign scheduling priorities				
-Automatic scheduling of an individual student i.e. mid-term transfer pupil				
-Ability to schedule groups of students i.e. unregistered last minute arrivals				
-Ability to 'UNSCHEDULE" a student or group of students i.e. no shows, students that move away during summer etc.				
-Restart capabilities e.g. reset assignments for a student and/or course				
-Course sequencing				
-Course weighting i.e. ability of the computerized scheduler to distribute course loads evenly so that a student is not scheduled to take an overload of difficult courses in the first semester and a group of relatively easier courses during the second semester				
-Blocking				
-Class balancing				
-Semester balancing				
-Double room identity e.g. Physical Education all male/female class				
-Double room identity for mixed classes e.g. Home Economics and Industrial Arts				

i) What are your present scheduling priorities
e.g. - lower grade students first and so on up to highest grade?

____

e.g. - single section courses before multiple section courses?

____

- CONTINUED ON NEXT PAGE -

Application/Feature Description	Relative Importance			
	NONE	OPT	IMP	MUST
e.g. - mandatory/compulsory courses first followed by student preferences followed by options/alternatives?				
____				
OR indicate your priorities in the space below:				
____				
____				
____				
____				
____				
-Ability to run schedules from more than one perspective e.g. single sections first then mandatory courses etc. and mandatory courses first and single sections last	____	____	____	____
-Other information needs (specify):				
____	____	____	____	____
____	____	____	____	____
____	____	____	____	____
____	____	____	____	____
____	____	____	____	____
Reports				
-Student schedules	____	____	____	____
-Multiple conflicts matrix	____	____	____	____
-Partially scheduled students	____	____	____	____
-Other (specify):				
____	____	____	____	____
____	____	____	____	____
____	____	____	____	____
____	____	____	____	____
4) School Start Up				
-Generation of fee sheets	____	____	____	____
-Ability to schedule all new students (unexpected enrollments) only i.e. the schedules for all previously registered students would not be affected	____	____	____	____
-Preparation of timetables in grid format (students, teachers and rooms)	____	____	____	____
-Class lists	____	____	____	____
-Other (specify):				
____	____	____	____	____
____	____	____	____	____

THE FOLLOWING ITEMS ARE PERCEIVED TO BE APPLICABLE
TO SCHEDULING IN JUNIOR HIGH SCHOOLS ONLY

Application/Feature Description	Relative Importance			
	NONE	OPT	IMP	MUST
5) **Special Scheduling Requirements of Junior High Schools**				
-Blocking of course options OR Scheduling students requesting same group of options into the same class or homeroom	____	____	____	____
-Blocking of 2-3 sections of the same course in same time block e.g. Math or Language Arts	____	____	____	____
-Homeroom identity grouping for Language Arts, Social Studies, Science, Math	____	____	____	____
-Ability to handle option courses with varying lengths of instruction e.g. French as an option requires four periods per week whereas other options require three periods per week	____	____	____	____
-Back to back time tabling for double classes	____	____	____	____
-Ability to handle variable time slots by course subject e.g. six periods of Language Arts, five periods of Math, four periods of Social Studies, etc.	____	____	____	____
-Other requirements or unique characteristics associated with the scheduling process for your school				
____________________	____	____	____	____
____________________	____	____	____	____
____________________	____	____	____	____
____________________	____	____	____	____
____________________	____	____	____	____
____________________	____	____	____	____

Please specify any idiosyncracies in your schools allocation of subject time e.g. different/variable periods (standard period = 40 minutes, course x has a period of 30 minutes, etc.)

PART 2 - OTHER INFORMATION SYSTEMS

Please rank the importance of each application in accordance with your schools priority to computerize other areas of its operations, e.g. 1, 2, 3 etc., from most important to least important. If an application is not perceived to be a requirement indicate a priority of "0" (zero) or "NIL".

Application/System or Sub-system	Implementation Priority
Accounts Payable	______
Accounts Receivable	______
Budgeting	______
Computer Assisted Instruction (CAI, CAL, CML)	______
Cost Accounting	______
Financial (General Ledger and Financial Statements)	______
- also indicate whether or not you require commitments to be included i.e. encumberance accounting Yes or No ______________	______
Fixed Assets	______
Inventory Control	______
Library Services	______
Purchasing	______
Word Processing	______
Work Orders	______
Other (Specify)	______
______________________________	______
______________________________	______
______________________________	______
______________________________	______
______________________________	______
______________________________	______
______________________________	______
______________________________	______

APPENDIX 2

INTERVIEW GUIDE AND DETAILED CHECKLIST

This document was used to facilitate a follow-up interview with surveyed schools to clarify and confirm their responses to the general questionnaire.

EDMONTON PUBLIC SCHOOLS

COMPUTERIZED INFORMATION SYSTEMS NEEDS OF INDIVIDUAL SCHOOLS

INTERVIEW GUIDE AND DETAILED CHECKLIST

SECTION A - School records, student records, attendance recording/reporting, student marking process and reporting requirements.

Application/Feature Description	Relative Importance NONE	OPT	IMP	MUST
1) Registration/Enrollment				
Use questionnaire.				
2) Student Records				
-Personal/Demographic				
-Courtesy name				
-Academic				
-Activities				
-Medical				
-Program				
-Type of instruction				
-Timetables				
-Courses and classes				
-Student history to include all courses/marks while in the school				
OR Does the school want to include all marks the student has achieved while in a similar level of school e.g. High School, Grades 10-12; Junior High, Grades 7-9 etc. Specify level of detail needed below: ______________________________ ______________________________				
-Complete history of each course that each student attempts, including the number of attempts				
-Parent data up to a maximum of 2 parents per student				

Application/Feature Description	Relative Importance			
	NONE	OPT	IMP	MUST
-Is a limit of 2 parents sufficient? Yes or No ____________				
-Bus pass number	____	____	____	____
-Bus route(s)	____	____	____	____
-Driver name	____	____	____	____
-Pick-up and drop off points	____	____	____	____
-Student ID # (indicate whether the school has a preference for its own unique ID system or the EPSD ID #) ____________	____	____	____	____
-Multiple ID's for cross referencing and interface with EPSD and Alberta	____	____	____	____

3) **Student Attendance**

Use questionnaire.

4) **School Reports**

Use questionnaire.

5) **Instructor Records**

Use questionnaire.

6) **Student Marking Process**

	NONE	OPT	IMP	MUST
-Report cards prepared by school rather than ISB Yes or No ____________ If Yes indicate level of importance	____	____	____	____
-Student marks proof listing for verification before production of report cards	____	____	____	____
-Student transcripts	____	____	____	____

7) **Student Exams**

Use questionnaire.

Application/Feature Description	Relative Importance			
	NONE	OPT	IMP	MUST
8) Courses				
-Term weight	____	____	____	____
-Included/excluded from report card average	____	____	____	____
-Pass/Fail mark	____	____	____	____
-Other (specify):				
________________________________	____	____	____	____
________________________________	____	____	____	____
________________________________	____	____	____	____

SECTION B - STUDENT SCHEDULING

N.B. THIS SECTION SHOULD BE COMPLETED FOR HIGH SCHOOLS AND JUNIOR HIGH SCHOOLS ONLY

Application/Feature Description	Relative Importance			
1) Pre-scheduling				
-Student course/program/curriculum counselling list	____	____	____	____
-Marks verification as part of prerequisite checking e.g. 49% in Math 10 is not acceptable for entry into Math 20 course but is acceptable for Math 23	____	____	____	____
In this case should the student be advised of his/her options before the scheduling simulation i.e. repeat Math 10 or opt for Math 23? Yes or No ____________?	____	____	____	____
-Ability for the individual student to identify his/her				
a) mandatory/compulsory courses	____	____	____	____
b) preferred course requests	____	____	____	____
c) preferred alternatives	____	____	____	____

CONTINUED

Application/Feature Description	Relative Importance			
	NONE	OPT	IMP	MUST
-Ability to conduct prerequisite checking for students from another school within the EPSD	____	____	____	____
-Ability to handle co-requisites	____	____	____	____
-Ability to add student records from another EPSD school into your microcomputer e.g. transfer student, graduate student from a feeder school etc.	____	____	____	____
2) **Master Schedule**				
-Current Semester	____	____	____	____
-Current Year	____	____	____	____
-Future Semester(s)	____	____	____	____
-Other (specify):				
________________________________	____	____	____	____
________________________________	____	____	____	____
________________________________	____	____	____	____
3) **Student Scheduling**				
-Access to scheduling alorithim e.g. logic, parameters, scheduling resolutions, options etc.	____	____	____	____
-"Teacher Link Courses" e.g. in the instance where a teacher is instructing English 10 and Social 10, a common core of students should be scheduled to this teacher for both courses (subjects)	____	____	____	____
-Arena scheduling	____	____	____	____
-Student section selection (preference)	____	____	____	____
-Student instructor selection (preference)	____	____	____	____
-Reduced term requests i.e. scheduling a student into, say, the second semester of a full year English course in order to improve his/her grade without repeating the first semester which he/she passed satisfactorily	____	____	____	____
-Specific term requests e.g. Biology 10 in first semester and Biology 20 in the second semester	____	____	____	____

CONTINUED

Application/Feature Description	Relative Importance			
	NONE	OPT	IMP	MUST
-Other requirements for an in-house computerized scheduler: - use data from questionnaire and interview				

4) School Start Up

Use questionnaire.

5) Special Scheduling Requirements of Junior High Schools

Use questionnaire.

ENSURE THAT THE JUNIOR HIGH SCHOOL IDENTIFIES ITS UNIQUE NEEDS AND DEFINES ANY ITEMS OR AREAS THAT DIFFER FROM THE NORM.

PART 2 - OTHER INFORMATION SYSTEMS

ACCOUNTS PAYABLE (A/P)

1) Open item or balance forward

2) Does the school issue its own A/P cheques?

If Yes how many cheques does it issue per month on the average?

3) What is the average number of General Ledger distributions per vendor invoice?

4) If the school has indicated that the computerization of its Accounts Payable application is a need, obtain a general description of what the school expects from an automated system e.g. type of reports, statistical analysis, breakdown of A/P expenses (how?) etc.

5) Should the school's purchase orders be included in the A/P system to reflect commitments?

ACCOUNTS RECEIVABLE (A/R)

1) Open item or balance forward

2) How many invoices does the school issue per month?

3) Does the school issue monthly statements for unpaid accounts?

4) Why does the school want to automate its A/R application?
e.g. expected results, type and frequency of reports, revenue analysis, etc.?

BUDGETING

If computerization of General Ledger and Financial Statements are a need identified by the school suggest that the Budgeting application should be included as an integral part of the former system.

1) What information and/or statistical breakdowns do we need for budgeting e.g.:

-student count by category or program (ESL pupils, native children, etc.)

-previous years financial statements by department, program, cost centre, etc.

FINANCIAL (GENERAL LEDGER AND FINANCIAL STATEMENTS)

1) Should commitments be included in the schools financial reports i.e. encumberance accounting in order to ensure that the school knows where it stands in relation to its budget?

For example:

Total budget - (actual expenditures + PO commitments) = the balance available in the budget

2) Does the school require any interface/integration between its financial and student administrative system?

3) What type of G/L coding structure does the school envision?

e.g. EPSD G/L code

or

The schools own G/L code

4) How many G/L accounts does the school now use?

CONTINUED

5) What objectives is the school seeking through computerization of its financial information i.e. type and frequency of reports, budget analysis etc.

6) How many different fund sources does the school have?

e.g.

EPSD funds (from provincial and municipal taxes)

TRIM funds (Text book rental, fees and instructional materials)

Special project funds derived from school initiatives i.e. car washes, bottle drive etc., for field trips (glee club, band, soccer team)

Other

7) Does the school require separate financial statements for each fund it is responsible for?

8) Are consolidated financial statements required by the school?

9) What other financial information does the school need?

COMPUTER ASSISTED INSTRUCTION

Obtain a general description of the schools needs and expectations in this area.

Cost Accounting

1) Could the schools requirements in this area be included in the general ledger financial statements. If not obtain a conceptual overview of the type of cost accounting information required by the school.

FIXED ASSETS

1) What general class of items does the school want to include in this application?

2) Are the school's fixed assets currently tagged with a permanent identifier?

3) Approximately how many items does the school estimate it would include in its automated fixed asset sysem?

4) Obtain a brief conceptual overview of what the school expects from a fixed asset system.

5) What type and frequency of reports does the school need from this system.

INVENTORY CONTROL

1) Does the school have a central storage facility?

2) What type(s) of inventory and how many items, issues and receipts does the school wish to control?

e.g. Automotive shop

Wood shop

Home Economics, etc.

3) Does the school need to integrate its purchase orders with inventory control?

4) What does the school need in the way of an inventory control system? Describe briefly.

LIBRARY SERVICES

1) How many books does the school estimate to have in its library?

2) Computerized needs

-Cross Reference by Author?
Title?
Publisher?
Subject?
Key words?

-Checkout/Renewal

-Returns

-Overview notices/lists

-Fines

-Other

3) Statistics e.g. usage?

4) Obtain a general conceptual overview of the schools needs in this area.

PURCHASING

General requirements, volumes and brief conceptual overview.

WORD PROCESSING

Estimated volumes, frequencies

Type of word processing needed i.e.

- personalized letters
- mass mailings
- reports
- general correspondence

Try to determine an estimate of the school's current work load.

WORK ORDERS

Estimated Volumes

How are they handled now?

Are W/O's costed out e.g.

labour $

material $

Are W/O's integrated into the financial system?

General conceputal overview and description of system needs.

APPENDIX 3

DETAILED SCORING COMPARISON FORM

			PRODUCT 1:		PRODUCT 2:		PRODUCT 3:	
EVALUATION FACTOR	CRITERIA ITEMS	WEIGHT (W)	SCORE (S)	WEIGHTED SCORE (W X S)	SCORE (S)	WEIGHTED SCORE (W X S)	SCORE (S)	WEIGHTED SCORE (W X S)
PRODUCT SCOPE & FUNCTION	**SCHOOL RECORDS**							
	Pre-Registration/Enrollment							
	Create student record	15						
	Registration confirmation notice	3						
	Feeder school confirmation notice	2						
	TOTAL Pre-Registration/Enrollment	20						
	Detailed Data Items							
	Student information	25						
	Instructor Information	5						
	Course information	15						
	TOTAL Detailed Data Items	45						
	Reports/Inquiries	25						
	TOTAL Reports/Inquiries	25						
	TOTAL SCHOOL RECORDS	90						
	SCHEDULING							
	Manual scheduling (Arena Scheduling)	7						

Detailed Scoring Comparison Form

EVALUATION FACTOR	CRITERIA ITEMS	WEIGHT (W)	PRODUCT 1:		PRODUCT 2:		PRODUCT 3:	
			SCORE (S)	WEIGHTED SCORE (W X S)	SCORE (S)	WEIGHTED SCORE (W X S)	SCORE (S)	WEIGHTED SCORE (W X S)
	Pre-scheduling							
	Course Requests							
	manual entry	5						
	automated entry	9						
	Edit and validation of course requests	7						
	Pre-scheduling reports	9						
	TOTAL Pre-Scheduling	30						
	Master schedule builder							
	Capability to build a master scheduler							
	manually	6						
	automatically	9						
	Capability of handling a variety of scheduling units	9						
	User defined timetable rotation/tumble	10						
	Flexible number of periods per day	10						
	Capability to specify exclusive male or female sections	5						
	Capability to maintain current and future year/semester master schedules	8						
	TOTAL Master Schedule Builder	57						
	Scheduling Process							
	User defined scheduling sequence	6						
	Unscheduling of no-shows/withdrawals	5						

EVALUATION FACTOR	CRITERIA ITEMS	WEIGHT (W)	PRODUCT 1:		PRODUCT 2:		PRODUCT 3:	
			SCORE (S)	WEIGHTED SCORE (W X S)	SCORE (S)	WEIGHTED SCORE (W X S)	SCORE (S)	WEIGHTED SCORE (W X S)
	Scheduling of individual student or small groups of students	6						
	Capability to reset all students or partially scheduled students	8						
	Capability to lock scheduling assignments for all students or a group of students	8						
	Restart capability	8						
	Course weighting/semester balancing (ensure even course load for students)	8						
	Blocking of courses	7						
	Section balancing	8						
	Class balancing (males-females)	4						
	Capability to keep scheduling open after school start while starting to use the attendance module	9						
	TOTAL Scheduling Process	77						
	Scheduling Reports/Inquiries	10						
	Junior High Scheduling Requirements							
	Homeroom grouping for core subjects	9						
	Capability of scheduling any course in any combination and number of time periods	10						
	TOTAL SCHEDULING	200						
	STUDENT ATTENDANCE							
	Entry of Attendance Data							
	manual entry	5						
	automated entry	9						

EVALUATION FACTOR	CRITERIA ITEMS	WEIGHT (W)	PRODUCT 1:		PRODUCT 2:		PRODUCT 3:	
			SCORE (S)	WEIGHTED SCORE (W X S)	SCORE (S)	WEIGHTED SCORE (W X S)	SCORE (S)	WEIGHTED SCORE (W X S)
	Multiple user-defined absence types	8						
	Capability to record attendance data at various intervals	10						
	Attendance history	8						
	Attendance reports/inquiries	10						
	TOTAL ATTENDANCE	50						
	STUDENT MARKS							
	Entry of marks data							
	manual	5						
	automated	9						
	Marks data	10						
	Student Exams	6						
	Exam timetable builder Exam Reports/Inquiries							
	Reports/Inquiries	10						
	TOTAL STUDENT MARKS	40						

EVALUATION FACTOR	CRITERIA ITEMS	WEIGHT (W)	PRODUCT 1		PRODUCT 2		PRODUCT 3	
			SCORE (S)	WEIGHTED SCORE (W X S)	SCORE (S)	WEIGHTED SCORE (W X S)	SCORE (S)	WEIGHTED SCORE (W X S)
	UTILITY FUNCTIONS							
	Backup/Restore	12						
	Security/Controls	8						
	TOTAL UTILITY FUNCTIONS	20						
	GRAND TOTAL, PRODUCT SCOPE AND FUNCTION	400						
EASE OF USE		60						
	GRAND TOTAL, EASE OF USE	60						
TECHNICAL CONSIDERATION		80						
	GRAND TOTAL, TECHNICAL CONSIDERATIONS	80						
SUPPORT & SERVICES		70						
	GRAND TOTAL, SUPPORT & SERVICES	70						

EVALUATION FACTOR	CRITERIA ITEMS (W)	WEIGHT (S)	PRODUCT 1:		PRODUCT 2:		PRODUCT 3:	
			SCORE SCORE (W X S)	WEIGHTED (S)	SCORE SCORE (W X S)	WEIGHTED (S)	SCORE SCORE (W X S)	WEIGHTED
PRODUCT QUALIFICATIONS		80	___	___	___	___	___	___
	GRAND TOTAL, PRODUCT QUALIFICATIONS	80	☐	☐	☐	☐	☐	☐
VENDOR		70	___	___	___	___	___	___
	GRAND TOTAL, VENDOR	70	☐	☐	☐	☐	☐	☐

APPENDIX 4

SIRS USER GROUP MEMBER LIST

February 4, 1985

School	Contact	Phone
Foothills Composite High School Okotoks, Alberta TOL 1TO	Terry Storch	938-6116
Grande Cache Community High School Box 599 Grande Cache, Alberta TOE OYO	Doug Perras	827-3502
Paul Kane High School 12 Cunningham Road St. Albert, Alberta T8N 2E9	Donna Powell	459-4405
Redwater School Box 790 Redwater, Alberta TOA 2WO	Henry Fiege	942-3625
Richard F. Staples High School Box 369 Westlock, Alberta TOG 2LO	Art Aitken	349-4454
Rocky Mountain House Jr/Sr High School Box 1840 Rocky Mountain House, Alberta TOM 1TO	Forest Bird	845-3711
Sturgeon Composite High School Namao, Alberta TOA 2NO	Cal Cosh	973-3301

Appendix 5 Recent Product Developments

Since completing the formal evaluations of the three microcomputer based packages in February 1985, there have been a number of product announcements and system enhancements. The following sub-sections list important developments that are known at the time of writing.

MIG SIRS

Core subject blocking:	Up to 9 classes can be blocked together to provide core subject sections for groups of students. For example, in a Junior High School, subjects such as Physical Education and Mathematics are compulsory and have to be blocked together for different homeroom groups.
Adding speed and function to the scheduler	The development plans call for an increase in the speed and function of the Scheduler by recording parts of the software in "C" and reintroducting scheduling parameters.
Interface with the NCS SENTRY 3000 scanner:	Software is being developed to handle automatic scanning of course requests and other standard forms. This is very important for a large school. Edmonton Public School District is already using the SENTRY 3000 scanner with another software package.
Interface with the "Surveyor" auto dialing	This development will provide student home telephone numbers to the "Surveyor" system used to call parents when students are absent or late.

COMPUTERLIB CEMAS

Computerlib has been informed of the evaluation work and has been asked to send information on recent developments. At this point in time we have not received replies to our requests.

COLUMBIA TSS

Multi-user Facilities:	The School System supports 2 users on an IBM XT and up to 4 users on an IBM AT using the Multi-link software package and suitable RAM memory boards.
File Builder:	The File Builder produces sequential text output files from the database. These can be used for data transfer to other computer systems.
Prepare to Schedule New Year:	After running the process, reports can be printed for the current scheduling year from the Student Scheduling system. The current and new school years can now be used concurrently and students can be enrolled.

Mark Averages:	These are now calculated using the "include in GPA" indicator in the Marks Directory.
Report Reprinting:	Reports can now be reprinted after paper jams or user requests for a second copy of the report.
Academic History:	A simple academic history facility has been provided but has not yet been tested by the Distributed Systems Team.

Appendix 6 Relative Suitability of SIMS - Full Re-simulation

As has been previously stated, the evaluation process is extremely flexible allowing a single user or group of users to apply it from their particular needs/requirements perspective. The purpose of this appendix is to demonstrate this flexibility.

In all previous simulations (in the main body of this report), the full set of evaluation criteria was used and critiera weighting factors were kept constant - only the percent emphasis distribution was changed.

The following example assumes that products do not need to be evaluated against the complete set of criteria and further, that the weighting factors associated with those criteria which will be used should be changed.

For the purpose of this example, the Detailed Scoring Comparison Form has been used to represent the data and to illustrate the changes which have been made.

EVALUATION FACTOR	CRITERIA ITEMS	WEIGHT (W)	TSS		SIRS		CEMAS	
			SCORE (S)	WEIGHTED SCORE (W X S)	SCORE (S)	WEIGHTED SCORE (W X S)	SCORE (S)	WEIGHTED SCORE (W X S)
PRODUCT SCOPE & FUNCTION	SCHOOL RECORDS							
	Pre-Registration/Enrollment							
	Create student record	0	6	0	8	0	7	0
	Registration confirmation notice	0	5	0	2	0	0	0
	Feeder school confirmation notice	0	2	0	0	0	0	0
	TOTAL Pre-Registration/Enrollment	**0**	**13/30**	**0**	**10/30**	**0**	**7/30**	**0**
	Detailed Data Items							
	Student information	25	8	200	8	200	9	225
	Instructor Information	5	3	15	7	35	2	10
	Course information	15	8	120	8	120	1	15
	TOTAL Detailed Data Items	**45**	**19/30**	**335**	**23/30**	**355**	**12/30**	**250**
	Reports/Inquiries	0	6	0	6	0	1	0
	TOTAL Reports/Inquiries	**0**	6/10	0	6/10	0	1/10	0
	TOTAL SCHOOL RECORDS	45	**38/70**	335	**39/70**	355	**20/70**	**250**
	SCHEDULING							
	Manual scheduling (Arena Scheduling)	0	9	0	9	0	8	0

			TSS		SIRS		CEMAS	
EVALUATION FACTOR	CRITERIA ITEMS	WEIGHT (W)	SCORE (S)	WEIGHTED SCORE (W X S)	SCORE (S)	WEIGHTED SCORE (W X S)	SCORE (S)	WEIGHTED SCORE (W X S)
	Pre-scheduling							
	Course Requests							
	manual entry	5	9	45	7	35	4	20
	automated entry	0	9	0	4	0	0	0
	Edit and validation of course requests	7	6	42	9	63	3	21
	Pre-scheduling reports	9	8	72	9	81	2	18
	TOTAL Pre-Scheduling	**21**	**32/40**	**159**	**29/40**	**179**	**9/40**	**59**
	Master schedule builder							
	Capability to build a master scheduler							
	manually	5	8	40	7	35	8	40
	automatically	0	0	0	0	0	1	0
	Capability of handling a variety of scheduling units	0	6	0	8	0	0	0
	User defined timetable rotation/tumble	30	10	300	8	240	0	0
	Flexible number of periods per day	30	10	300	8	240	4	120
	Capability to specify exclusive male or female sections	0	4	0	8	0	6	0
	Capability to maintain current and future year/semester master schedules	5	3	15	10	50	1	5
	TOTAL Master Schedule Builder	**70**	**41/70**	**655**	**49/70**	**565**	**20/70**	**165**
	Scheduling Process							
	User defined scheduling sequence	0	5	0	7	0	4	0
	Unscheduling of no-shows/withdrawals	0	9	0	9	0	6	0

EVALUATION FACTOR	CRITERIA ITEMS	WEIGHT (W)	TSS		SIRS		CEMAS	
			SCORE (S)	WEIGHTED SCORE (W X S)	SCORE (S)	WEIGHTED SCORE (W X S)	SCORE (S)	WEIGHTED SCORE (W X S)
	Scheduling of individual student or small groups of students	0	8	0	0	0	7	0
	Capability to reset all students or partially scheduled students	10	10	100	0	0	5	50
	Capability to lock scheduling assignments for all students or a group of students	5	5	25	0	0	7	35
	Restart capability	0	0	0	0	0	1	0
	Course weighting/semester balancing (ensure even course load for students)	30	7	210	7	210	4	120
	Blocking of courses	20	9	180	8	160	0	0
	Section balancing	0	8	0	9	0	0	0
	Class balancing (males-females)	0	7	0	8	0	2	0
	Capability to keep scheduling open after school start while starting to use the attendance module	0	9	0	0	0	0	0
	TOTAL Scheduling Process	**65**	**77/110**	**515**	**48/110**	**370**	**36/110**	**205**
	Scheduling Reports/Inquiries	10	7	70	9	90	0	0
	Junior High Scheduling Requirements							
	Homeroom grouping for core subjects							
	Capability of scheduling any course in any combination and number of time periods							
	TOTAL SCHEDULING	**166**	**166/240**	**1399**	**144/240**	**1204**	**73/240**	**429**
	STUDENT ATTENDANCE							
	Entry of Attendance Data							
	manual entry	5	7	35	9	45	6	30
	automated entry	0	8	0	0	0	0	0

EVALUATION FACTOR	CRITERIA ITEMS	WEIGHT (W)	TSS		SIRS		CEMAS	
			SCORE (S)	WEIGHTED SCORE (W X S)	SCORE (S)	WEIGHTED SCORE (W X S)	SCORE (S)	WEIGHTED SCORE (W X S)
	Multiple user-defined absence types	5	9	45	8	40	0	0
	Capability to record attendance data at various intervals	20	9	180	9	180	6	120
	Attendance history	10	9	90	7	70	3	30
	Attendance reports/inquiries	20	6	120	7	140	2	40
	TOTAL ATTENDANCE	60	48/60	470	40/60	475	17/60	220
	STUDENT MARKS							
	Entry of marks data							
	manual	0	8	0	8	0	4	0
	automated	0	8	0	0	0	0	0
	Marks data	0	8	0	8	0	8	0
	Student Exams	0	0	0	0	0	3	0
	Exam timetable builder							
	Exam Reports/Inquiries							
	Reports/Inquiries	0	6	0	8	0	0	0
	TOTAL STUDENT MARKS	0	30/50	0	24/50	0	15/50	0

EVALUATION FACTOR	CRITERIA ITEMS	WEIGHT (W)	TSS SCORE (S)	TSS WEIGHTED SCORE (W X S)	SIRS SCORE (S)	SIRS WEIGHTED SCORE (W X S)	CEMAS SCORE (S)	CEMAS WEIGHTED SCORE (W X S)
	UTILITY FUNCTIONS							
	Backup/Restore	12	8	96	8	96	4	48
	Security/Controls	8	0	0	2	16	6	48
	TOTAL UTILITY FUNCTIONS	20	8/20	96	10/20	112	10/20	96
	GRAND TOTAL, PRODUCT SCOPE AND FUNCTION	291	290/440	2300	257/440	2146	135/440	995
EASE OF USE		60	8	480	6	360	3	180
	GRAND TOTAL, EASE OF USE	60	8/10	480	6/10	360	3/10	180
TECHNICAL CONSIDERATION		80	9	720	6	480	2	160
	GRAND TOTAL, TECHNICAL CONSIDERATIONS	80	9/10	720	6/10	480	2/10	160
SUPPORT & SERVICES		70	8	560	7	490	0	0
	GRAND TOTAL, SUPPORT & SERVICES	70	8/10	560	7/10	490	0/10	0

			TSS		SIRS		CEMAS	
EVALUATION FACTOR	CRITERIA ITEMS	WEIGHT (W)	SCORE (S)	WEIGHTED SCORE (W X S)	SCORE (S)	WEIGHTED SCORE (W X S)	SCORE (S)	WEIGHTED SCORE (W X S)
PRODUCT QUALIFICATIONS		80	9	720	6	480	0	0
	GRAND TOTAL, PRODUCT QUALIFICATIONS	80	9/10	720	6/10	480	0/10	0
VENDOR		0	8	0	7	0	1	0
	GRAND TOTAL, VENDOR	0	8	0	7	0	1	0

To remove a particular criteria (or set thereof) from consideration, the user simply sets the associated weighting factor to zero. This has the effect setting weighted scores to zero. The reader should note these changes by comparing the tables in this appendix to the tables shown in section 5.1. In this example, it can be seen that all weights associated with the SCHOOL RECORDS section have been set to zero, thus defining this particular feature to be irrelevant in determining product suitability. Similarly, the weighting factors associated with automated data entry within the context of scheduling, was also set to zero, thus implying that this particular feature is also irrelevant for evaluation purposes. Having eliminated certain criteria from consideration in this way, the relative importance of those which remain has been changed through adjustments to the weighting factors. For example, with the Pre-scheduling section, the reader will see that we have chosen to increase the importance of the user defined timetable rotation/tumble feature by changing its weighting factor from an (original) 10 to 30. Many other such changes have been made. Having done this, weighted scores have been re-calculated as shown and all totals appropriately adjusted. A summary of the important totals by major evaluation factors is shown in the table below together with the new ratios of weighted scores to maximum weighted scores.

PRODUCT	EVALUATION FACTOR	WEIGHTED SCORE	MAXIMUM WEIGHTED SCORE	(WEIGHTED SCORE) / (MAX.WEIGHTED SCORE)
TSS	PRODUCT SCOPE AND FUNCTION	2300	2910	0.79
	EASE OF USE	480	600	0.80
	TECHNICAL CONSIDERATIONS	720	800	0.90
	SUPPORT AND SERVICES	560	700	0.80
	PRODUCT QUALIFICATIONS	720	800	0.90
	VENDOR	0	0	0.00
SIRS	PRODUCT SCOPE AND FUNCTION	2146	2910	0.74
	EASE OF USE	360	600	0.60
	TECHNICAL CONSIDERATIONS	480	800	0.60
	SUPPORT AND SERVICES	490	700	0.70
	PRODUCT QUALIFICATIONS	480	800	0.60
	VENDOR	0	0	0.00
CEMAS	PRODUCT SCOPE AND FUNCTION	995	2910	0.34
	EASE OF USE	180	600	0.30
	TECHNICAL CONSIDERATIONS	160	800	0.20
	SUPPORT AND SERVICES	0	700	0.00
	PRODUCT QUALIFICATIONS	0	800	0.00
	VENDOR	0	0	0.00

Relative suitabilities are now calculated in exactly the same way as before according to

$$\text{Relative Suitability} = \%\ \text{Emphasis} \times \frac{(\text{weighted score})}{(\text{max weighted score})}$$

and are shown in the table following

EVALUATION FACTOR	EMPHASIS (%)	RELATIVE PRODUCT SUITABILITY		
		TSS	SIRS	CEMAS
PRODUCT SCOPE AND FUNCTION	50	39	37	17
EASE OF USE	15	12	9	5
TECHNICAL CONSIDERATIONS	0	0	0	0
SUPPORT AND SERVICES	30	24	21	0
PRODUCT QUALIFICATIONS	5	4	3	0
VENDOR	0	0	0	0
TOTALS	**100**	**79**	**70**	**22**

A different percent emphasis distribution was used here which effectively removed Vendor and Technical Considerations from the evaluation. It is worth noting that removal of an entire major evaluation factor from consideration can be achieved by either setting all associated individual weighting factors to zero or by setting the percent emphasis to zero for that particular major evaluation factor to zero.

The results of the above application of the process on a narrower set of criteria can be compared with the table in section 5.2 of this report. It is important to note that this application of the process is based on a purely hypothetical user perception and was presented for illustration purposes only.

The final and most important point which must be made here is that, while weighting factors and percent emphases were changed to reflect user perspective, the actual raw scores remained unchanged. Raw scores reflect the results of hands-on testing and evaluation by the evaluation team whereas weights and emphasis are at the discretion of the user and reflect his/her biases.

"END OF DOCUMENT"